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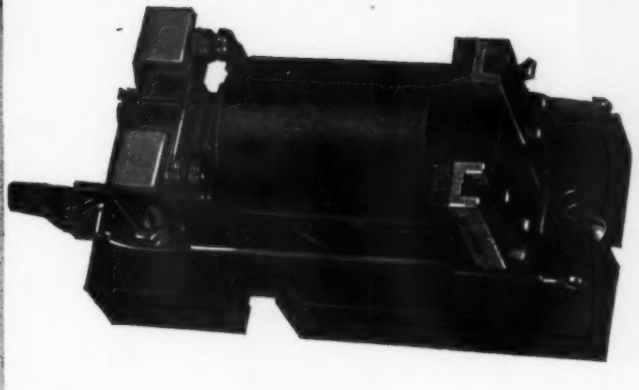

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The Journal of the Telephone Industry

MAY 26, 1945

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Published by
TELEPHONY PUBLISHING CORP.
608 S. Dearborn St., CHICAGO (5), ILL.
Telephone Wabash 2435

SUBSCRIPTION—15 Cents a Copy (Except special issues); $3 a year U. S. and Countries in U. S. Spanish Postal Zone; $4 Canada; $5 Other Countries.

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PLANNING BETTERMENTS IN *Rural Telephone Service*

By **RAY BLAIN**
Technical Editor

PRESENT indications point to the fact that there probably will be a considerable increase in farm line telephone service during the first few years following the war. Just how this service will be provided is anyone's guess at the present time. Farm line service always has been a problem for operating companies as present rates for such service do not, in general, provide sufficient income to furnish the best grade of service.

This condition may be corrected in the postwar era, but it is now the general opinion that our present plans should not contemplate too much in this direction. Engineering studies for the future should embody a rural line plant of low first cost, as trouble free as possible, calling for a minimum of maintenance. This, we must agree, is quite a difficult matter to be settled. One answer will not be satisfactory for all locations, but local conditions must be evaluated carefully. This article does not attempt to solve all of the knotty problems, but only suggests a few ideas for the consideration of those who contemplate an improvement and increase in their farm line service after the war has been won.

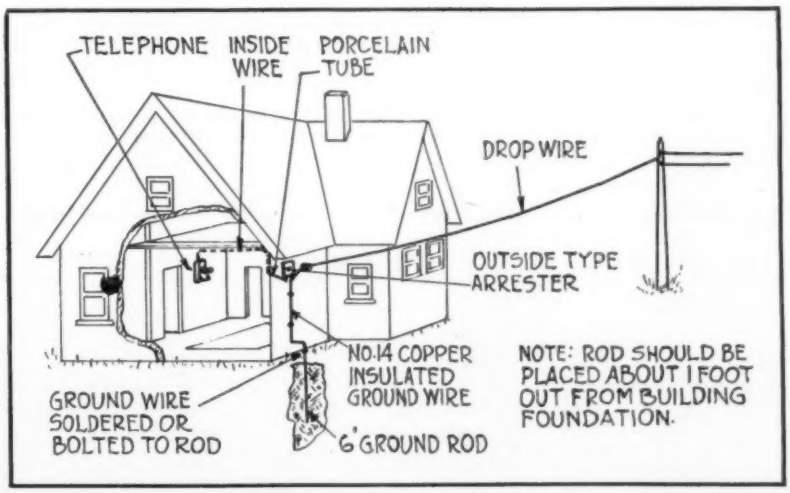
Undoubtedly, long span open wire construction will continue to be used to advantage in some localities. Both high tensile strength steel wire and copperweld will be used for farm line telephone service. We have learned considerably about this method of construction during the past few years and test installations have proved highly successful. In this connection, span lengths of 450 ft. have been used successfully on various test installations.

Buried wire was used rather extensively during its experimental stage, but the over-all results did not prove to be entirely desirable. Several large installations in certain sections of the country developed so much trouble that it was necessary to abandon its use. These installations used the plain rubber insulated wire which was buried without a shield or drain wire. Lightning and rodents caused its rapid destruction in certain other localities. It is believed that a comparatively inexpensive metallic shield will be perfected for this type of wire and by employing the plowing-in method it will prove to be entirely satisfactory for certain types of farm line installations. Some of the new plastics may be used successfully for the insulation of buried wire.

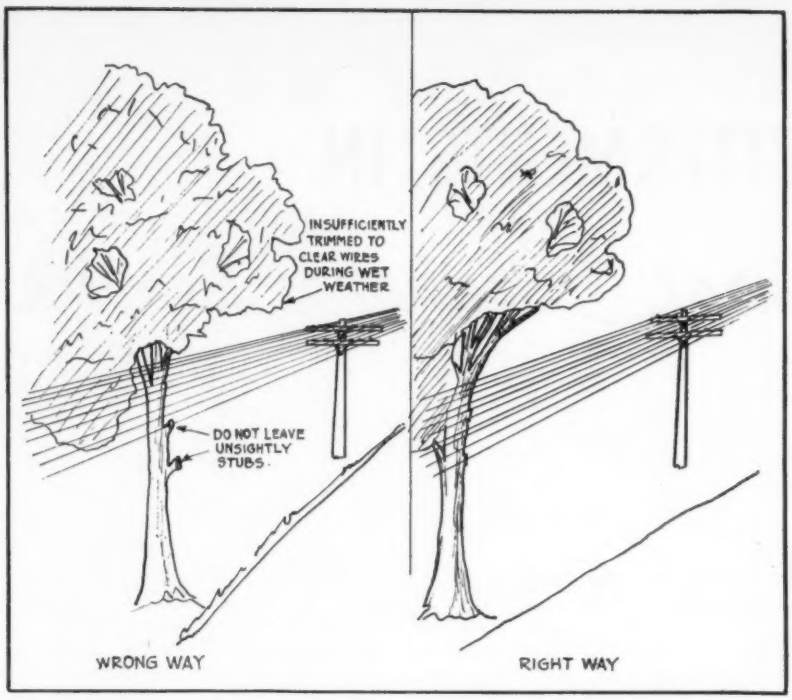
Considerable comment has been heard with reference to the use of power carrier frequency systems for rural line service. While this type of service is possible, present indications do not point to a great saving over physical circuits in the immediate future. In time this may be corrected, but for the present there does not seem to be much prospect for the use of carrier systems for rural line service until some time after the end of the war.

Engineers and scientists of the Bell Laboratories started work in 1938 to develop a practical system of transmitting telephone conversations over electric power lines. This system is known as "rural telephone carrier" and, in the opinion of engineers, offers promise as one means of furnishing telephone service to farms located a great distance from an established telephone line, but near to a power line.

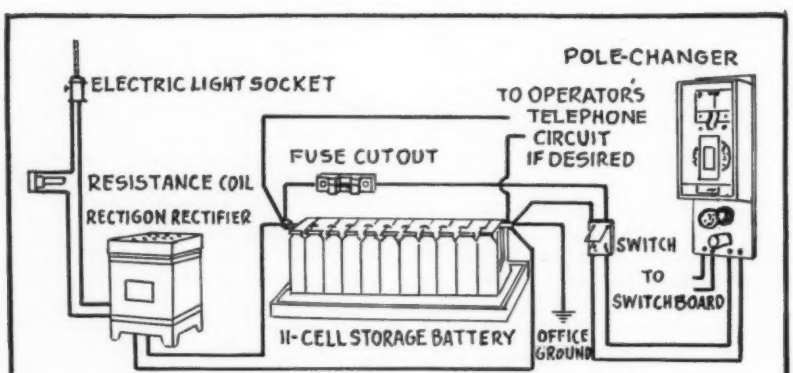
This system transmits a very high frequency current over the power wires. Field trials of power line carrier were


TELEPHONE
INSIDE WIRE
PORCELAIN TUBE
DROP WIRE
OUTSIDE TYPE ARRESTER
NO.14 COPPER INSULATED GROUND WIRE
NOTE: ROD SHOULD BE PLACED ABOUT 1 FOOT OUT FROM BUILDING FOUNDATION.
GROUND WIRE SOLDERED OR BOLTED TO ROD
6' GROUND ROD

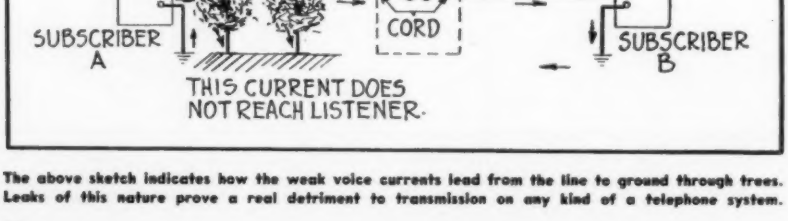
An ideal farm line telephone station installation. Drop wire run from open wire dead-ended at the last pole to the house, a good ground connection, with a protector installed on the outside of the house. Installations made in this manner with good materials always are comparatively trouble free.



The right and wrong way to trim trees to provide clearance for lines. It is not necessary to ruin the tree to provide proper line clearance.



One type of storage battery and charging arrangement which can be applied to power line adapters, when used to convert part of a magneto exchange to common battery operation.



The above sketch indicates how the weak voice currents lead from the line to ground through trees. Leaks of this nature prove a real detriment to transmission on any kind of a telephone system.

started in 1940 through the cooperative efforts of the Bell Laboratories and the Rural Electrification Administration. It was clear that a suitable system of this type could be produced when development work was interrupted by the war. The carrier system may be used on any rural power line. It also may be used to add extra channels on a physical telephone circuit.

Various telephone companies are considering the possible use of microwave radio systems to provide rural telephone service. This type of communication would prove especially useful for reaching a small number of subscribers in remote locations. The principal difficulty with this system at the present time is the inability to obtain allocation of necessary wave lengths or frequencies.

It would appear probable that numerous advantages could be obtained by the use of small, unattended dial exchanges for rural line service. This type of service has proved entirely satisfactory during the past several years in many localities, but the future application may be slightly different. This new application may take the form of five or 10-line unattended switching units mounted in a weatherproof box located on a pole or pedestal. Electric power will be available for operation of a battery eliminator for charging a small storage battery. Electric power also would be used to maintain a constant temperature inside the equipment housing.

These dial units could be located advantageously so as to facilitate local distribution. Also, they would eliminate the present practice of having too many parties on a single line. Routine testing and inspection, with a practice of preventive maintenance should hold trouble to a minimum. Such switching units would then be trunked into the nearest exchange. There is a possibility that power carrier systems could be used successfully to provide this trunk service. If open wire or cable is used to furnish trunk service, phantom and simplex circuits could be used to advantage.

If everyone confronted with a farm line service problem could start from scratch by rebuilding all lines and replacing both central office and station equipment in its entirety, it would be the ideal solution. Unfortunately, this probably is not possible in many cases, therefore, old plants must be overhauled and reconditioned in order to carry on and give a satisfactory grade of service for a few more years. Due to constant development work on the part of Independent manufacturers, numerous improvements to old equipment which often prove highly desir-

able can be made at a reasonable cost. An attempt will now be made to describe a few of these features in the hope that they may prove useful to readers who contemplate an improvement in their farm line service and who do not feel justified in a complete replacement of existing equipment.

In almost all magneto telephone exchanges there often are a number of subscribers who prefer and are willing to pay extra for the convenience of central energy service. The use of a few common battery telephone sets generally is considered a desirable improvement in any local battery exchange. Exchanges served by a good magneto switchboard can provide such service to as many subscribers as desire it at a very small cost and without making any changes in the switchboard itself. Neither will the service to other magneto lines or subscribers be affected. This common battery service on a magneto switchboard can be provided by the use of a central battery line adapter which can be procured at a reasonable cost per line. Individual lines may be equipped as desired or required.

The central battery line adapter consists of a four-winding repeating coil assembly which is connected into a line by means of pumpers on the main frame as indicated in *Fig. 1.* Direct current is fed into the line circuit through the winding of the repeating coil. With this arrangement, whenever a subscriber lifts his receiver or handset, a circuit is closed over which direct current flows through the primary windings of the adapter. This action induces a surge of current in the secondary windings, operating the drop signal at the switchboard. The call then is handled by the regular operator in the usual manner. When the conversation has been completed, the subscriber restores the receiver to the switch hook which opens the direct current circuit through the primary winding of the adapter. This action again induces a current in the secondary and operates the drop for supervision.

The principles of operation of this adapter are very simple, but several factors must be balanced carefully to insure quiet and efficient transmission and dependable operation of the drop signals. This necessary balance has been achieved in the central battery line adapter described above.

Distributed capacitance and effective resistance of coil windings are balanced to within .01 of 1 per cent. Accurate construction maintains the balance between both sides of the line, and thus prevents the introduction of line noises. The transmission efficiency

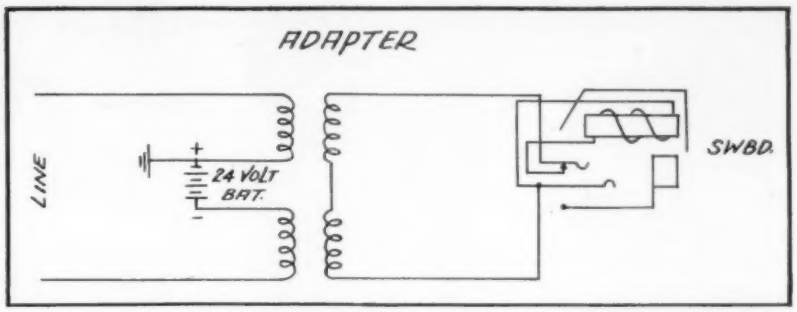


Fig. 1. Method of connecting line adapter in the circuit to convert magneto lines to common battery operation.

of the adapter is very high, the loss being only about .57 db.

The adapter will operate an ordinary 1,000-ohm drop over a 300-ohm line with insulation resistance as low as 25,000 ohms. The operation of the drop is from the current induced by the opening and closing of the 24-volt primary circuit. Due to the fact that a much stronger current is produced when such a circuit is opened than when it is closed, it is always advisable to instruct subscribers to flash the operator, at least once, when making a call.

The adapter is a small unit, 3½ ins. high, 2¼ ins. wide and 4⅜ ins. long. These units can be mounted on a special rack near the main frame or on the main frame itself. It is a simple matter to change any number of lines from magneto to common battery operation by the use of these comparatively inexpensive adapter units. It is, moreover, necessary to replace the magneto telephones with common battery instruments on all line conversions. Any of the standard makes of common battery instruments will be suitable for this type of service.

In order to obtain maximum distance from the 300-ohm loop, it is a good idea to remove all high resistance splices and defective line wire. Compression type sleeves will be found ideal for this purpose. In order to provide the best possible insulation resistance on lines, all broken or missing insulators should be replaced and trees trimmed to a good clearance. Tree interference on lines is one of the greatest detriments to good rural telephone transmission on any kind of a system.

Lines equipped with central battery line adapters will utilize straight line ringers for individual lines or for code ringing on party lines. Telephones also may be equipped with harmonic ringers in all multiple and non-multiple frequencies for selective ringing lines. The adapters may be used on lines up to four parties, however, all telephones on a magneto party line must be replaced by common battery telephones at the same time. Reverting calls on a party line necessarily must be handled by the exchange operator.

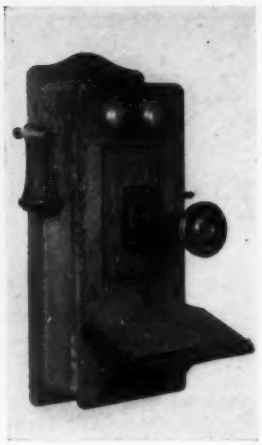
Full metallic ringing must be used with this service. The ringers should be not less than 1,000 ohms resistance and each telephone should be equipped with a two mf. condenser in series with the ringer coils.

The power consumption of lines equipped with these adapters is exceptionally low. Perhaps the most simple and inexpensive method of supplying current is by the use of a 24-volt storage battery. This battery can be maintained in a practically fully charged condition by the use of a trickle type charger.

When reliable AC commercial power is avaliable, it often is considered desirable to power the adapter equipped lines from a battery eliminator. However, due to the fact that even a momentary power failure usually is considered disastrous to telephone service, a stand-by dry cell battery must be utilized. A relay, which automatically will switch the dry cell battery into the circuit during the time the commercial power is interrupted, can be provided.

We probably will see an improvement in the postwar magneto telephone. The small sized hand generator will permit the design of a self-contained combination desk set. We have seen such a telephone of European design which is changed from desk to wall type by removing two screws and reversing a plate on which the switch hook is mounted. It would seem that a hanging handset telephone is the most ideal type for residence use under average conditions.

Numerous operating companies have modified their old magneto telephones by replacing the old transmitters and receivers with a new switch hook and a handset. A conversion kit containing all of the necessary parts to make the change now is available. Instruments so changed not only give better service and represent a savings in money, but

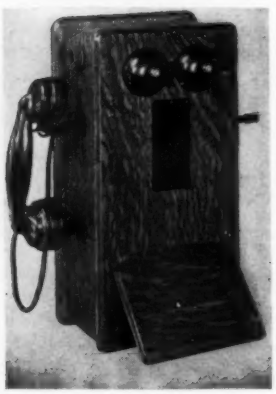


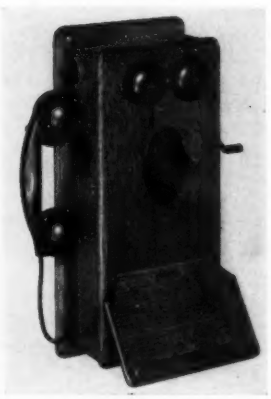
OLD TELEPHONES

← *Like These*

Can Be Converted INTO HANDSETS

Like These ↓





also promote greater satisfaction among subscribers.

We are informed by a certain telephone engineer that he has a plan to equip a magneto telephone with a 20-cycle reed vibrator and a transformer to permit push-button ringing and eliminate the hand generator. This auxiliary is designed to operate from the talking battery. It is understood that from 10 to 13 watts of power will be required to operate this push-button ringing arrangement. It would seem that this heavy drain might prove excessive on the present type of dry cell talking battery. It may be possible though that new types of dry cell batteries now being perfected for wartime communication will make this type of service possible when released for civilian use.

There is a possibility that the new mercury dry cell which has been developed for the armed services for use in the tropics also may have a most useful telephone peacetime application. It is claimed that this type of cell has a long operating life, as well as long shelf life in storage. These cells are hermetically sealed and have what is known as a "flat discharge" characteristic. This means that the voltage, within practical limits, remains constant up to the end of the cell life. These cells, within rated current range, possess the same service, measured in ampere hours, whether the battery is operated intermittently or continuously. Recovery time is not required.

One objection most telephone people have to magneto service is that the average subscriber forgets to ring off after the completion of a call and lines and equipment are tied up unnecessarily. It is claimed that, with this proposed new ringing arrangement, the switch hook can be wired to make a contact momentarily when the receiver is being replaced, upon the completion of a conversation, to feed a ringing pulse out on the line and operate the supervisory drop.

From a cost standpoint, the vibrating reed and transformer will compare favorably, it is understood, with the cost of a good, heavy duty hand generator. It must be admitted, however, that hand generators will operate for years without attention whereas this new arrangement might require considerable maintenance. Trouble on long rural lines always proves expensive.

One exchange manager informs us that he has removed the hand generators from his magneto telephones and is using a small dry cell battery controlled by a push-button to kick the ring-down drop on the switchboard. It is claimed that shelf life is obtained from these small signal batteries. It would appear that fairly clear lines with good insulation resistance would be required for the successful operation of a system of this nature.

Now that most farms are provided with reliable electric power, it would seem possible to provide an AC type battery eliminator at a reasonable cost. Such an arrangement could be designed to supply both talking battery and ringing current for a telephone at a moderate expense. The one main difficulty with such an arrangement is that dry cells necessarily would have to be provided for stand-by service and used in case of power failure. Perhaps small sealed type storage batteries could be utilized for this purpose. We do not claim that this idea will prove practical, but it does appear to have enough possibilities to merit consideration.

Recent improvements in station wiring supplies and methods, if used on rural lines, should reduce maintenance cost considerably. Certain plastic wire insulating materials have proved satisfactory for telephone work. Modern station protectors, when properly installed, cause very little trouble. Good

(Please turn to page 68)

Small Companies Can Get Help

By FRANCIS X. WELCH
Telephony's Washington Editor

SUPPOSE you wanted to wreck the telephone industry. You don't have to approve the idea. Just suppose that for some reason or other it became your job to destroy private enterprise in the telephone business. Let us say—just to make it interesting—that, for accomplishing this, you stood to gain a handsome reward by way of financial gain, or political office, or social prestige, or any combination of the three.

All right. How would you go about it? Think that over coldly, clearly and unemotionally. Using your best talents and so forth, how would you start?

Chances are you would see if there were any divisions or old feuds within the industry which might be agitated. "Divide and conquer" is the surest formula, as Hitler (or Hitler's ghost) could testify. He was winning as long as he kept his enemies divided; he began to lose as soon as they became united.

Yes, if you would be a smart and efficient wrecker of the telephone industry in the United States, your best bet would be to check over the industry's background to see if there are any cracks or fissures in its structure which judiciously could be pried apart, or, if they already are closed by the healing treatment of time, to see if they could be opened up again. Needless to say, in the telephone industry as in every industry which has any sort of a life span at all, there are such cracks and crevices, mostly grown over. These are but marks of growth and expansion, just as the grown-over cracks and crevices on the bark of a mighty tree are the normal evidences of growth and expansion.

Generally speaking, the crevices which are to be found in the unifying bark which covers the American telephone industry might be classified into three groups: (1) Possible differences between the companies and their consumers as represented by regulatory authorities; (2) possible differences between Independent companies, themselves; (3) ancient differences between the Bell organization and the Independents.

Now, taking the first of these groups, if you wanted to drive an effective wedge between the telephone companies and the regulatory commissions, it would be most important to keep them apart. How can this be done? You would try to isolate entirely one group from the other. You would try to make the commissions suspicious of the companies, and the companies afraid of the commissions. You would promote misunderstanding so they would hesitate to write or talk to one another. Once this atmosphere has been developed, it would be difficult, if not impossible, for telephone companies to discuss their rate problems or other problems with the only people in the world who effectively can do something about them.

In fact, the telephone companies would not want such discussions. Conversely, the regulatory commissions would have no opportunity for convincing telephone company management just what is required of them in the way of making their service satisfactory to the public on the best possible terms, assuming reasonably profitable operation.

Indeed, if the wedge once is driven between the commissions and the companies, particularly the smaller telephone companies which lie close to the outside bark of our great central trunk of telephone industry, an important opening has been made. In this opening, fatal poisons, political and otherwise, parasitical growths and other destructive elements can be introduced, which are quite likely to develop a disease which can, in time, bring the entire structure crashing down in ruins. That would mean your job had been accomplished.

Perhaps the most potent poison to be introduced into this initial opening would be the poison of political propaganda to promote intra-industrial misunderstanding. That brings us to our second and third classes of vulnerable possibilities; namely, causing friction between smaller companies, themselves, and between Bell and non-Bell companies. This is the way to rot out the very heart of the industry and make it a tottering setup for the first adverse winds of economic pressure, political adversity, or what not.

But enough of this role of professional wrecker, which probably has made you uncomfortable while merely reading the general description. Approaching the problem of *aiding* the small company in this manner has the advantage of showing beyond all doubt what steps are necessary to protect the industry and insure its continuation as a tower of strength in our great system of free, private enterprise in the United States.

One truth which is apparent from our little analogy, so far, is the fact that the basic long-range health of the entire industry, both Bell and Independent, lies in the protection of the smaller companies, since they are most vulnerable to hostile operations. It logically follows that it is to the selfish advantage (using that phrase in its better sense) of both Bell and the larger Independent companies to see that these smaller, but most important outlying units of the industry, are kept in healthy condition. We shall note some practical suggestions along that line later on.

Let us get back to the question of countermeasures which might be taken against splitting the smaller companies from their good relations with the public, as represented by the regulatory commissions. The first practical step along this line might be summed up in four words—*know your state commission.*

It is astonishing to know how many

smaller companies have developed unnecessary and entirely unfounded stage fright with respect to their state commissions and their regulatory staffs. This writer has made an effort to determine the reason for this by talking and corresponding with some of the smaller company officials.

Here is about the way the matter shapes up: Most small company officials know the *names* of their state commissioners and a slightly lesser percentage knows their political background. Relatively few, however, seem to be on personal speaking terms with their state commissions and roughly about half of the small company people with whom this writer has had an opportunity to discuss the matter seem to be reluctant, if not terrified, about making any effort to get on a better basis of understanding.

The trouble isn't entirely one-sided. Some of the state commissions, without any deliberate design, seem to have made little effort to get on a "round-table discussion" basis with small companies. Anyway, here is the gist of a typical letter received from a small company operator in West Virginia:

"I only get to Charleston (the state capital) once or twice a year and I don't go near the public service commission unless I have to. I figure the further I stay away from those fellows the better off I am. If, as you suggest, I try to get on easy talking terms with any of these commission fellows, how do I know how they would take it? They might think I was after some improper advantage. And, in that case, it might do me more harm than good. Anyway, I am known in my county as a Republican and the majority of the commission is Democratic, so I might not be very welcome."

With all due respect for the very obvious sincerity of the writer of this letter, as shown by his fine sense of propriety by avoiding what might be regarded as an improper approach, it is submitted his attitude is wrong. It is wrong because it is based upon a mistaken idea about his own public service commission. There isn't a single regulatory commission in the United States that would not gladly underwrite the statement that *politics (race, religion or other collateral considerations) makes absolutely no difference in state commission dealings with regulated companies.*

As a matter of fact, a good many commissioners are so sensitive to criticism on this point that they avoid all mention of the subject. If the matter of political differences cannot be avoided, they bend over backwards in their efforts to show that politics "cuts no ice" before the bar of regulatory justice.

Another wrong idea this small company man had, was his fear that his attempt to make a friendly approach to the commission might be regarded as improper. True, there may be a few individual commissioners still in office throughout the United States who would take such a small attitude. But the preponderance of sentiment is overwhelmingly to the contrary.

Marine communication crews prepare their headquarters in two grass huts abandoned by the retreating Japanese on Okinawa Island. Due to the lack of opposition, the Marine forces were well established on the island shortly after the initial landings. (Official U. S. Marine Corps Photo)

When we stop to realize that the primary purpose of the various state legislatures in establishing these commissions was to set up a specialized tribunal to deal fairly with the public and the utilities alike, it ought to be clear that the only way a commission really can do its job is to open up all possible lines of honest, straight-forward communication with the companies it is to regulate.

This does not mean that utility officials should make bald attempts to curry favor with state commissioners in any objectionable manner. Larger companies presumably have sense enough to avoid any such temptation. In the case of the smaller companies there is little danger because of the very nature of the relationship. You don't have to join the commissioner's lodge to get a square deal, but there's no harm in knowing him well enough to call him by his first name.

As a matter of fact, most public service commissions *want* to make friends with small company men. They want to see them, to talk with them, to discuss their problems. Several of the more active commissions have set up special staff agents whose sole duty is to circulate around the states in the smaller communities and find out if everything is going smoothly and, if not, whether the commissions can help.

The problem, therefore, seems to be largely a matter of taking the initiative. We can only expect the state commissions to go so far. We hardly can expect them to come into a small company plant, look it over and say, "Why don't you ask for a rate increase?"—even though service might be suffering and a rate increase warranted. This much is certain: If small companies make a practice of knowing their state commissioners and their key staff members by name, by conversation, by correspondence, and in any other proper manner, they always will have a convenient approach when the time comes to discuss matters with the commission. Further, they are assured of a sympathetic hearing.

Not long ago, the engineer for a state commission had reason to go out on a field inspection as the result of a complaint that the service of a small telephone exchange was collapsing and about to be abandoned. The report this engineer brought back to his superiors was a shocking recital of inadequate revenue, run-down plant, inefficient management and supervision. The reaction of the commission was "Why doesn't somebody tell us these things, before the situation gets to the point of abandonment?"

Well, perhaps the commissions could (if they wanted to) do something about it by establishing a systematic program for visiting the little, out-of-the-way members of their regulatory flock. It does not seem out of line to suggest that state public service commissions might well consider the establishment of a special liaison officer — perhaps one of the commissioners, charged with the duty of regular field visitation—to make the acquaintance of small utility operators of all kinds to the end that

public service in remote communities is safeguarded. This duty might be rotated to spread the experience, if not the responsibility.

It takes time and tact to establish this routine. A former chairman of one of the larger state commissions who used to have this job as a staff member once told this writer, "When I first started going the rounds they looked at me as if I were a bank examiner out to get the goods on them. It took time to dissolve this suspicion. But before six months were up I began to get fat from home-cooked fried chicken dinners and found myself toting little things out from the state capital, such as government forms, patent asthma medicine, and what have you."

One easily can imagine the cordial relationship that could grow between the small operators and their state commissions under a visitation routine handled by such a discreet official. No wonder he rose to be the head of the commission in later years.

Know your operating neighbors and Independent manufacturers better.

Coming now to our second category of possible differences which might make the telephone industry vulnerable to outside attack, we run right into the scriptural admonition "Love thy neighbor." It is surprising how many small Independent telephone company men are not intimately acquainted with their neighbors in the same class.

A Texas lawyer who represents a number of small telephone companies once told this writer that he was the instrument for bringing together two small exchange owners who operated in different sections of the same county for 10 years without knowing each other, except through formal group meetings. There are big counties in Texas; even so, that condition should not exist. There was no grudge here —no hard feelings at all. It was just that one of the operators said he intended to get over and visit the other, but "was so busy I never got around to it." The other operator had about the same story. When they finally did get together, however, they ganged up on the lawyer and saved some money by making him give them a joint proposition for legal services. The lawyer told this as a joke on himself, but there is a moral behind it.

The national and state associations can do a great deal, but not everything, in bringing together smaller Independents for purposes of united action and common interest in the same operating problems. Add to that the tremendously helpful services of the Independent manufacturers who for years have gone up and down the face of the country, and some pretty backwoods country at that, not only helping these smaller companies out with their problems, but helping to bring them together.

It still isn't enough. They have got to know each other man to man, continuously. They've got to trade shop talk week after week, rather than once a year or less at state association conventions or the big national convention of the United States Independent Telephone Association. When one small company is thinking about a rate case, his neighbor has a right to be advised and, naturally, he will help out all he can. "Love thy neighbor," in this sense, is not only good Christian doctrine but good business management as well.

Know your Bell neighbor better, if you have one.

Coming now to our third classification of possible division within the industry, we find that there really is very little actual basis surviving for bygone differences between Bell and non-Bell companies. Most of these differences had their origin in territorial disputes which have long since been settled one way or the other. It might be safe to say that in probably not more than a dozen localities in the entire country could Independent telephone operators be put under oath today and give an affirmative answer to the question, "Do you think the Bell System is hankering after your territorial business?" In the vast majority of instances, the Independent men well know the contrary is true.

That being so, there is no reason why the smaller Independent company should not seek and reasonably expect, as a matter of industrial courtesy, the friendship and actual assistance, within practical limitations, of its Bell neighbors. One hardly needs to make that suggestion to the larger Independent companies for they already have taken it. For that matter, so have most of the smaller ones. But there are still surviving grudges here and there. Look at the matter this way: It is to the advantage of the Bell System to have the smaller companies operate successfully, — meaning not only rendering good service, but with sufficient profits so they will be satisfied to continue in business and render good service.

Every associated Bell company this writer has had occasion to contact locally (and that means most of them, by the way) has a liaison official, generally known as "connecting company agent," or some such title, whose exclusive job it is to be friendly and helpful to the Independent companies. Small company officials should not be hesitant about availing themselves of such assistance if they are operating in neighboring Bell territory. It is hard to imagine any situation in which the resulting Bell suggestions would be given on any other than an entirely disinterested and friendly basis.

Let us say a smaller company has a construction or maintenance problem which has given it trouble for some time. Maybe its Bell neighbor has the answer for the asking or can find out in a matter of hours and will be glad to volunteer the information. Why should the Independent official hesitate to ask? Maybe it is a very simple thing, such as what color or quality of paint to use for a special purpose. Maybe it is help on an accounting puzzle or a rate matter. There are practical limitations, of course, to which Bell or the larger Independent manufacturers or operating "neighbors" can go without coming to a special understanding.

But the reaction of a New England Bell official talking about this matter, probably is typical: "We always are ready to do all we can because it is to our own advantage to do so. Furthermore, I can say that generally we have been willing to do more than ever was asked of us."

Summing up, therefore, it would seem that small Independent companies can help themselves best and can get help from others by following these three simple general rules:

(1) *Know your state commissions better.*

(2) *Know your neighbors and Independent manufacturers better.*

(3) *Know your Bell neighbor better, if you have one.*

Cashing in on all three of these rules not only will unite the small companies with each other but with the core of the telephone industry as a whole. It will render it immune to the divisive forces which are seeking an opening through means of political propaganda, disguised as federal aid or subsidy, to cause dissension in an industry where it has no reason for existing.

» Of all our troubles, great or small, the greatest are those that don't happen at all.

» Politeness is like an air cushion: there may be nothing in it, but it eases the jolts.

Rural Line Maintenance Tips

By DANIEL SEITZ
Cable Superintendent
York (Pa.) Telephone & Telegraph Co.

WITH the customary methods of rural line construction, circuits are more vulnerable than larger groups of lines carried in lead covered cables, because of greater exposure to the elements. Until such time as rural lines can be placed underground successfully by means of buried wire or cable, these conditions must be tolerated and maintenance practices that will provide the maximum life of the poles, wires, etc., must be applied. Iron or steel wire which often is used for rural lines do have a relatively short life, but when faults such as noise, poor transmission and ringing troubles develop, it is not always an indication that the maximum life of the wire has been obtained. Defective splices, poorly made during construction or when subsequent repairs are made, often are the real fault.

Every trouble man's kit, in addition to testing sets for ringing, talking and dialing, should include an ohmmeter. The ohmmeter is useful for testing the continuity of circuits, induction coils, transmitters, splices in line wire, fuses, etc.

Fig. 1 indicates approved methods of using an ohmmeter for making a number of tests. For testing a transmitter, see 1-A. Disconnect the transmitter from the set and connect the ohmmeter test leads to the terminals and observe the swing of the pointer while talking into the transmitter. A wide swing back and forth of the pointer will indicate that the transmitter is functioning properly. When the pointer remains stationary or nearly so anywhere along the scale of the meter, it is an indication of trouble and the transmitter should be replaced.

When investigating poor transmission complaints, neither the transmitter nor batteries of magneto telephones should be replaced without first making proper tests. Test the batteries with an approved type ammeter and transmitters as described above. Never add a new battery to a telephone when either of the old batteries are partially exhausted. Refer to 1-B for testing the induction coil for opens, crossed windings or ground to the core. See 1-C for testing fuses and fuse mountings; 1-D shows how to test the loop to open wire connections through solderless connectors. Refer to 1-E for measuring the resistance of suspicious splices in line wire.

If, after the telephone has been checked thoroughly and the necessary replacements and adjustments completed, further testing shows the transmission fault has not been corrected, the instrument, if it is magneto, should be disconnected from the line and the ohmmeter connected across the inside wire.

The shunt resistance of a normal magneto party line having 2,500-ohm ringers in the sets and six to 10 stations on the line should measure 300 to 400 ohms. This may vary more or less according to the type and length of the line wire. If the resistance measurement is 1,000 ohms or more, there is a possibility that the loop to main line connections are at fault and should be tested as shown by 1-D in *Fig. 1*. Connections found to have any resistance, no matter how low the value, should be cleaned thoroughly and tightened by the use of the proper tools. Never attempt to do the job by holding one part of the connector between thumb and fingers and pliers on the other part to draw it up to the proper tension. Use two socket wrenches, if available, and, if not, use two pairs of pliers.

Lightning arresters should be inspected carefully for loose terminals and fuses. Make sure the discharge blocks are in good condition and are placed properly. All protectors should be mounted vertically with either end up or down. Especially is this necessary if carbon discharge blocks are used with dialectrics having slots for self cleaning. The slot in the dialectric always should be along the bottom to allow the carbon dust to drop out. If these are placed so the slot is along

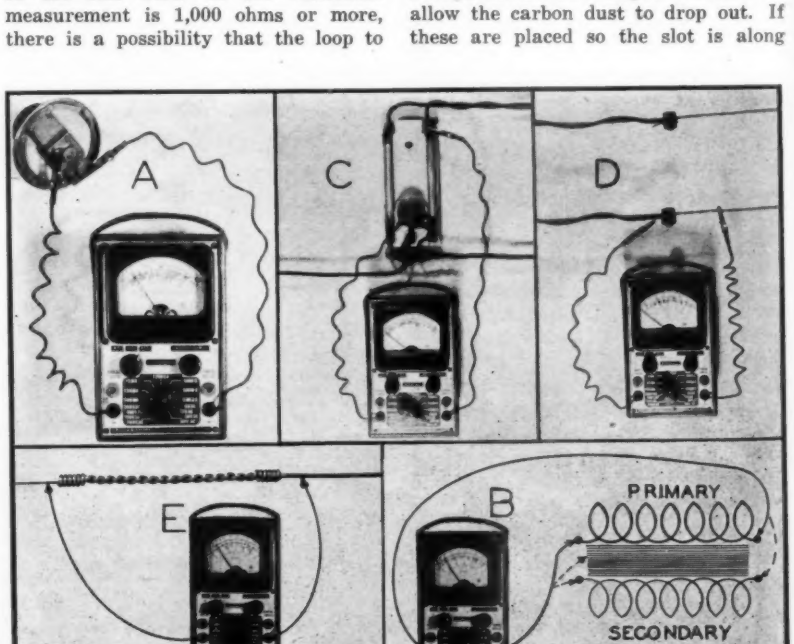


Fig. 1. Several tests that may be made with the ohmmeter.

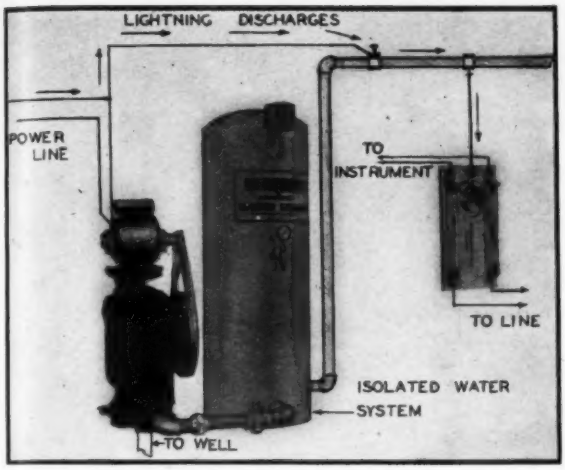
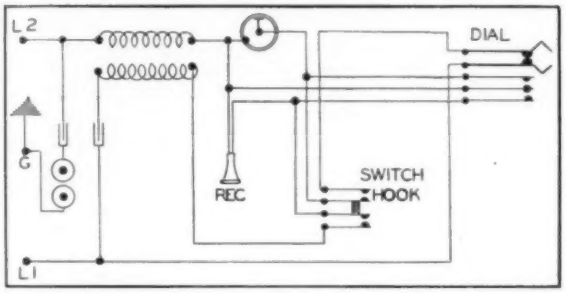


Fig. 2. Isolated electrically powered water systems.



Schematic diagram of a metallic dialing and grounded ringing telephone. Examination will show how lightning may find a path from line to ground and ground to line.

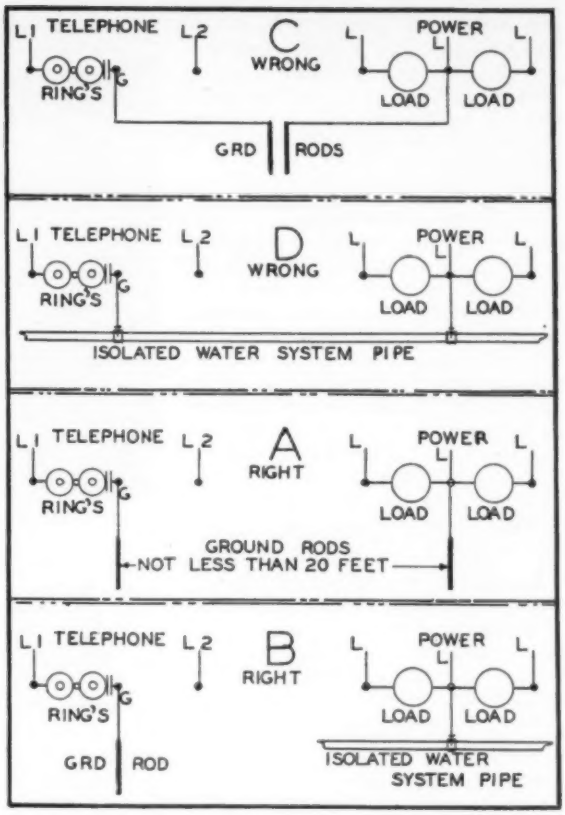


Fig. 3. Right and wrong way of grounding telephones.

the top, static discharges across the blocks will precipitate carbon dust which will be held between the blocks and eventually cause a ground.

Ground connections are required for nearly all rural subscriber station installations for ringing, dialing or protection. When grounds for ringing or dialing fail, the service is affected immediately. A protector ground may be removed entirely without interruption to service except—and this is very important—when lightning strikes, which in many cases makes it necessary to replace the entire installation. Sometimes, also, damage may be caused to the subscriber's property.

The protector ground wire should be of sufficient size to give it mechanical strength and should be run as directly as possible from the protector to ground connection. Avoid as many short turns as possible. Connecting to water pipes is considered by many engineers to be the most satisfactory method of obtaining a good ground. This is true in towns or cities where large grids are formed by the water distribution system. However, in rural sections where isolated water systems are powered by electric motors and the pipes are used for grounds, conditions quite often are different.

Fig. 2 shows a typical isolated electrically powered rural water system with the telephone protector grounded to the pipe. This is a dangerous practice because it affords a direct path for lightning from the power line to the telephone protector. Damage to the instrument, inside wire, protector, as well as the cable and switchboard, often results from this method of grounding. When grounded ringing and dialing is used, the risk is even greater.

The condition as described by *Fig. 2* apparently causes very little, if any, damage to the electric motor or other power equipment. Therefore, labor and other expense incurred when a driven ground must be provided and other corrective measures applied will fall largely on the telephone company. With increasing rural electrification, many new lightning hazards will be set up by power line grounds being placed too close to existing telephone grounds. All conditions of this nature should be investigated and the greatest possible separation of ground connections obtained.

Fig. 3 illustrates the right and wrong way to provide telephone ground connections. (3-A)—The greater the separation between the two ground rods, the better. (3-B)—The ground rod should be placed as far as possible from any buried pipe of the isolated water system. (3-C)—The ground rods are too close. (3-D)—Telephone and power grounded on same pipe. This is wrong as most isolated water systems are grounded, but are likely to have some resistance to earth and are not able to dissipate completely any lightning charges coming in over the power line.

Although a serious manpower shortage exists at the present time, rural pole lines should receive the necessary maintenance to insure good service. A broken pole, if neglected, may be the cause of adjacent poles falling down. Skilled labor is not required to reset the pole, or to bury a short slug by its side and wire the two together until the pole can be replaced.

Loose brackets and crossarm pins should be replaced immediately.

When spring comes, the new growth on trees increases the difficulty in keeping the lines clear. This especially is true when there are power lines in the same neighborhood, along the same roads or even through the same trees with the telephone lines. Telephone line noise, often attributed to inductive interference, frequently is caused indirectly by tree grounds or high resist-

ance connections aggravated by power line tree grounds, leaking insulators, lightning arresters or defective transformers. Also, power house equipment such as generators, condensers, etc., often are the cause of trouble of this nature.

A cooperative working arrangement should be maintained between the telephone and power company technicians and all noise conditions should be investigated and corrected as quickly as possible. When a new noise condition develops suddenly and spreads over an area of considerable size, usually some piece of power equipment has developed a fault. This may or may not cause an interruption in the power service. Sometimes the only indication of trouble is that the noise heard on the telephone lines may be of greater intensity on one line than another one, even though it is in the same locality.

By making listening tests or measuring the noise level on the lines, it often is possible to locate an area where the noise is noticeably greater in intensity and will provide a clue which will enable the power company engineers to locate the fault.

The possibility of a general power failure should be sufficient reason for the power company personnel to make every effort to clear the fault with the least possible delay. It is important to the telephone service that none of these noise conditions be permitted to exist longer than is absolutely necessary because should two or more faults develop in the same area the difficulties encountered in locating them are increased many fold. Portable battery operated radios equipped with a directional loop antenna sometimes are useful in locating power line trouble.

Power and telephone grounds should not be connected to isolated water systems as shown above.

It always will prove profitable for telephone companies to keep posted on power line construction and power distribution methods employed in general, particularly in the immediate neighborhood. Other facts such as voltage, whether it is grounded or not, and if so, how it is grounded; and whether it is single, two or three-phase, should be known. This information always is useful in the diagnosis of power line trouble which causes interference to telephone service.

It's unusual for a lady to telephone the telephone company and apologize for using her party line telephone so much, but one did. It appeared that her son, wounded three times in action in France, was in critical condition in an English hospital. His buddies, still in France, wrote home asking their relatives to contact the wounded man's family for news as to his condition. So the telephone rang more often than mother thought it should ring in all fairness to the other party on the line. When the other party heard the details, he said, "Tell her not to worry, I'm doing all right."—HELLO.

His wife was visiting her mother. When he arrived home late at night, a note fastened to the telephone caught his eye. In the handwriting of their foreign maid, he read, "Mz Nx Kuldop. Zo Zum Ykam Kulrop. Nemera Owlete Tzgonabe. Kulrop."

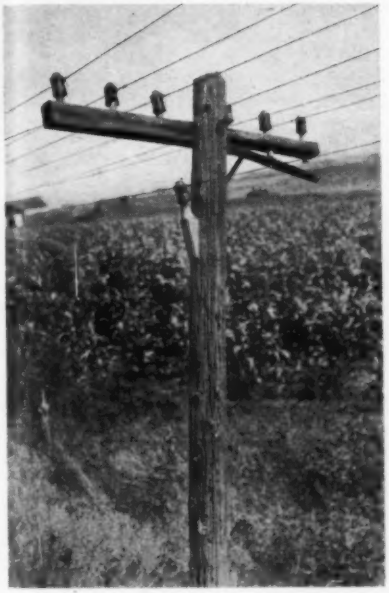
Half the night he lay awake puzzling over the mysterious message. In the morning the maid explained, "Mrs. Nix called up. So soon you come, call her up. No matter how late it's gonna be, call her up."

Avast, there, landlubbers! The Navy Department in Washington is going nautical. Beginning April 22, telephone operators at the department's giant 60,000-call-per-day switchboard abandoned the traditional and trite "Thank you" acknowledgment of requests in favor of the salty and exclusively maritime "Aye, aye, sir!"

"A little something extra," the Navy calls it—"an affirmative answer with a personality."

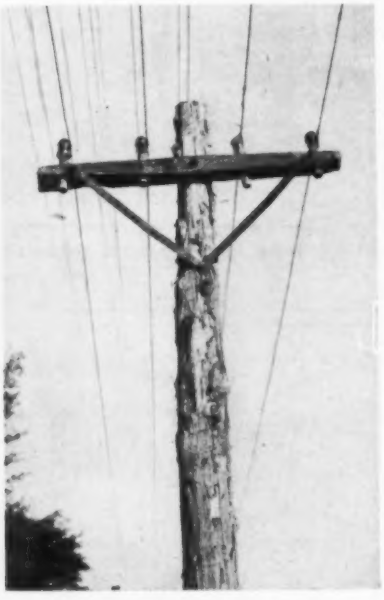
In India Signal Corps men found a telephone cable cut and a bucket placed under it. The cable resembles a water pipe, and hopeful natives had expected water to gush forth.

Rural Construction and Maintenance Kinks



Broken crossarms, if not promptly replaced, soon will harm service.

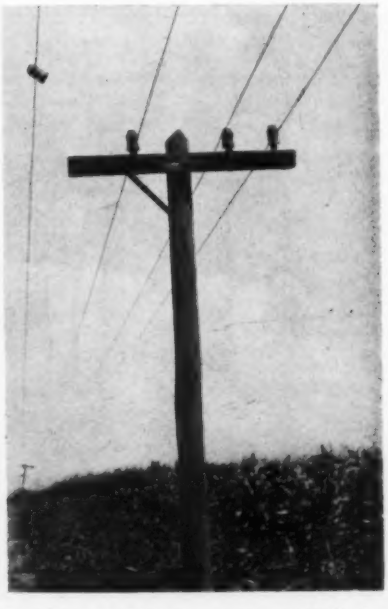
Broken poles such as this one never should be neglected.



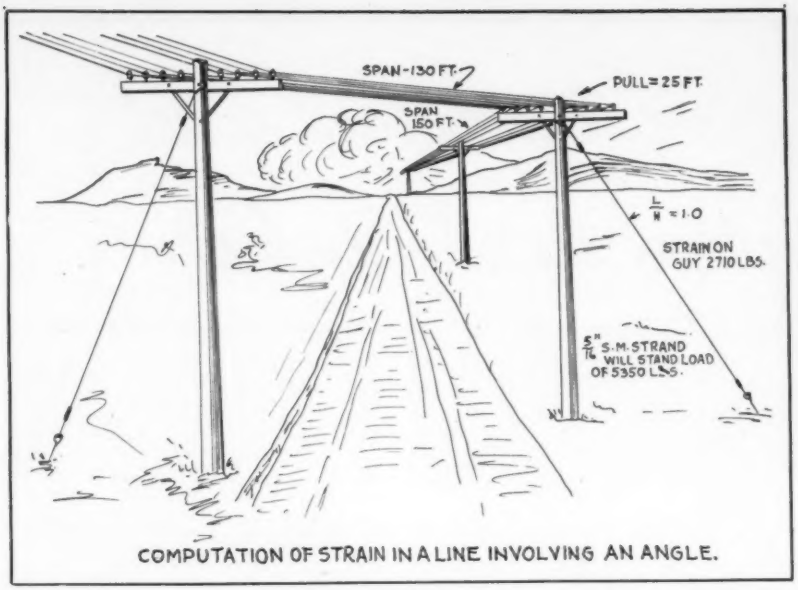
Broken insulators and weak-ended crossarms eventually will cause trouble.

Trees in the rural line soon will interfere with transmission.

Clearance in center of long spans need not be great if near protective fence.

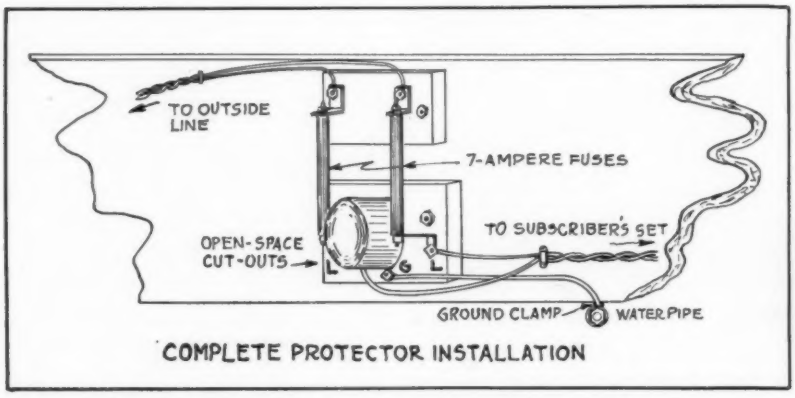


Floating insulators never should be tolerated on rural telephone lines.



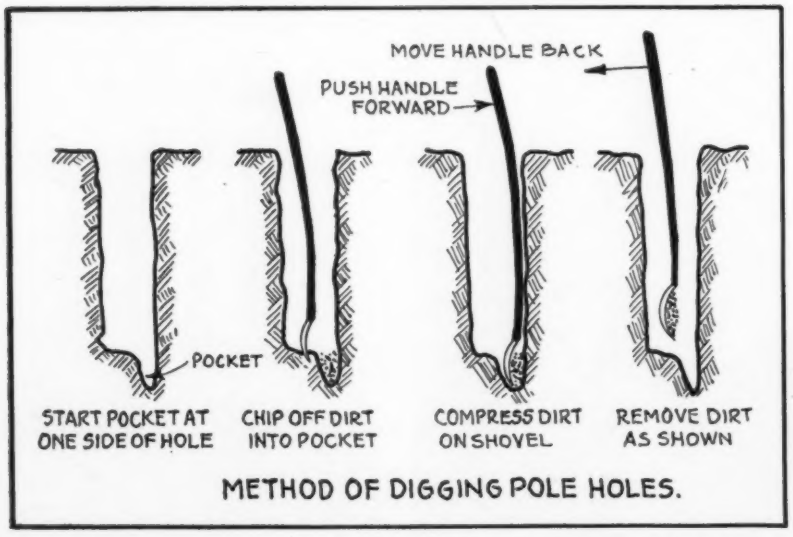
COMPUTATION OF STRAIN IN A LINE INVOLVING AN ANGLE.

This drawing shows how the strain on guys may be computed when an angle is encountered in a line.



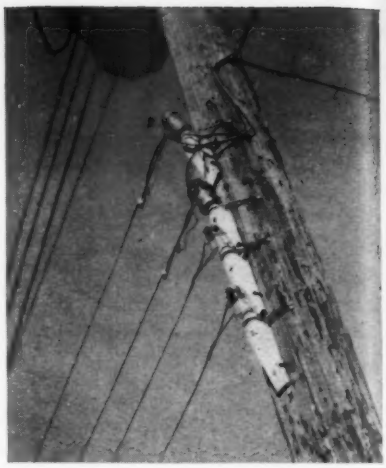
COMPLETE PROTECTOR INSTALLATION

How to install a subscriber's indoor type of station protector.



METHOD OF DIGGING POLE HOLES.

The digging of pole holes with the long handled shovel and spoon method is a most difficult job. This drawing indicates how this work may be handled to advantage.

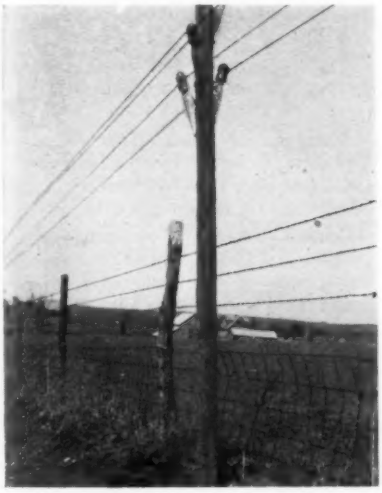


Good example of dead-ending. Note solderless connectors on drop wire.

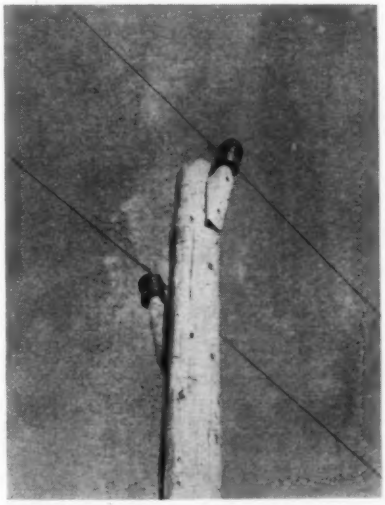
Short crossarms have been used successfully instead of brackets for long span construction.

A good rural line pole. While not high, it is strong; will carry the load.

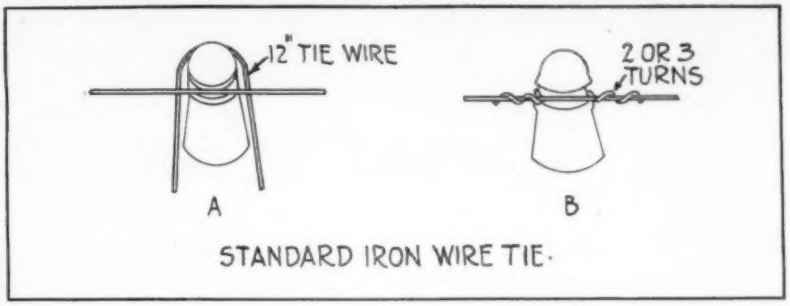
A good example of long span construction on a modern rural line.

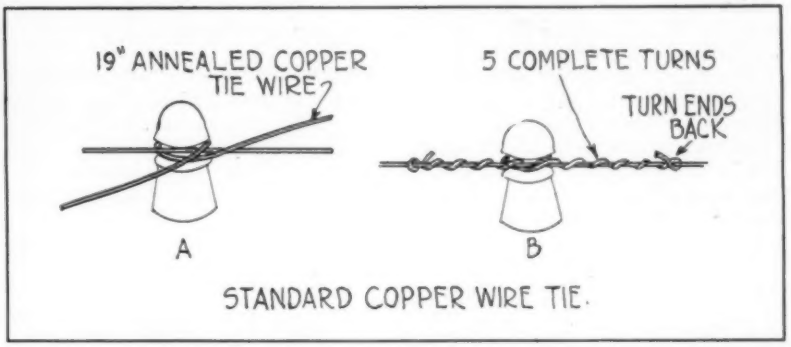


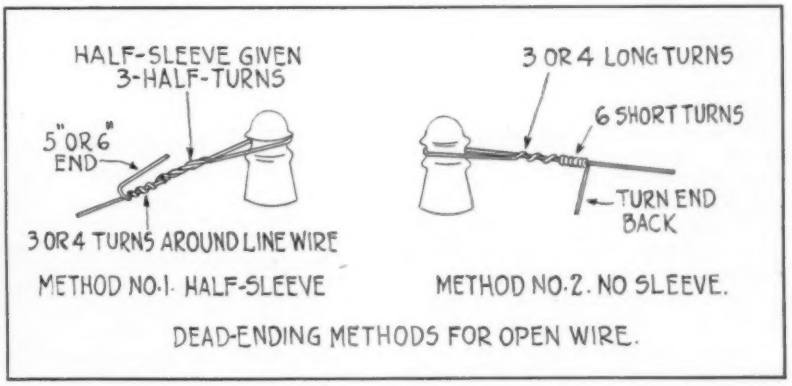
Small poles may be used to support rural lines located along a fence.



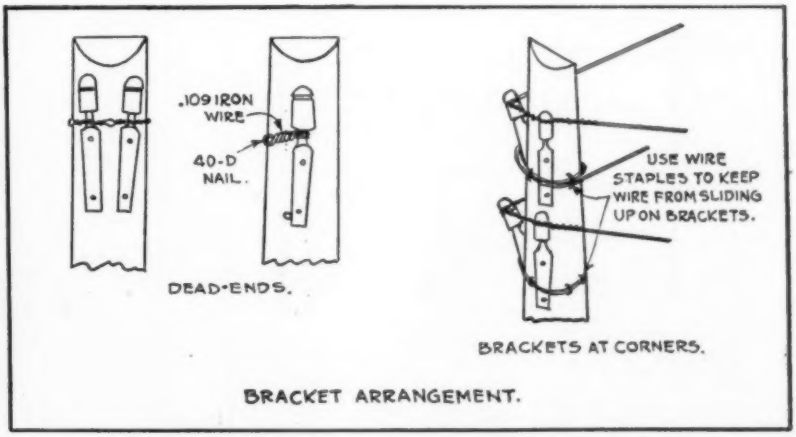
Brackets and insulators installed in this manner are not likely to cause trouble.






HALF-SLEEVE GIVEN 3-HALF-TURNS
5" OR 6" END
3 OR 4 TURNS AROUND LINE WIRE
METHOD NO. 1. HALF-SLEEVE
3 OR 4 LONG TURNS
6 SHORT TURNS
TURN END BACK
METHOD NO. 2. NO SLEEVE.
DEAD-ENDING METHODS FOR OPEN WIRE.

These drawings indicate in detail how to make approved ties on iron and copper wire for rural line use. Compression type sleeves also are available and prove entirely suitable for dead-ending.



Methods of attaching brackets to poles for dead-ending.

Rural Line Testing

By JOHN GRANT

[EDITOR'S NOTE: *With the present emphasis being placed on the necessity of improving rural telephone service, it is important that all telephone companies consider providing their plant men with proper testing equipment so that rural lines can be maintained properly. Many instruments are economical in cost and will more than pay for themselves in a short period of use.*]

* * *

TOO OFTEN in their search for faults on a rural telephone line, the troublemen of small companies work by instinct alone when their tasks could be made so much easier by the use of a few simple testing instruments. These instruments can be purchased at a reasonable cost when the saving in time their use will effect is considered. They also will permit service to be restored on lines with a minimum of delay. The purpose of this brief article will be to describe how a few testing instruments can be used to advantage in the clearing of rural line trouble.

Contrary to general belief, the use of testing instruments to make the work of trouble location easier is a very elementary operation. The simple detailed instructions received with each instrument makes its use by the man in the field an easy undertaking.

Tests for Shorts, Open Circuits, etc.

There is one lineman's test set that will be found convenient for use in locating trouble on open wire rural lines. This set consists of a magneto tone generator, a finder coil, receiver, transmitter, test lamp and test key. The manner in which it can be used is explained briefly as follows:

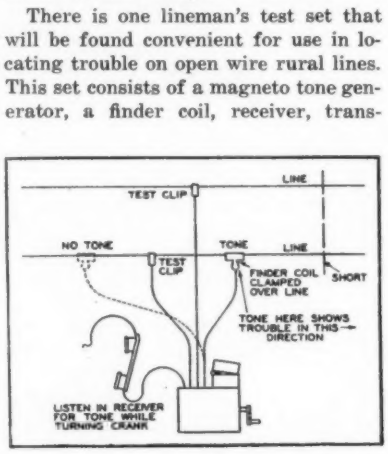


Fig. 1. Determining direction of a short circuit.

Direction of a short circuit from a given point may be determined in the manner indicated in *Fig. 1.* The line clips are snapped onto both line wires of a metallic circuit and the finder coil clamped over one of the line wires. If a tone is heard in the receiver when the crank is turned rapidly, the trouble is on the same side of the line clip on which the finder coil is located. If the tone is not heard, the finder coil should be moved to the other side of the line clip and the test repeated.

If the tone can be heard on both sides of the line, there is trouble in both directions. When this condition is found, the troubleman should go first in the direction of the loudest tone.

The distance to a short circuit may be determined by the use of the test lamp. This lamp will light if the line loop resistance is less than 600 ohms. The distance to the trouble then can be estimated by the brightness of the lamp. When the resistance is over 600 ohms, the lamp will not light, and the distance to the fault must be judged by the volume of the tone. The troubleman should move toward the fault and repeat the test until the trouble is located. If the trouble (short circuit) is passed, the tone in the receiver ceases.

Location of an Open Circuit. The troubleman first should place a short across the circuit and then proceed from it along the line. When the open is passed, the tone disappears. The use of this test on a grounded circuit is shown in *Fig. 2.*

Location of a Ground. This test is

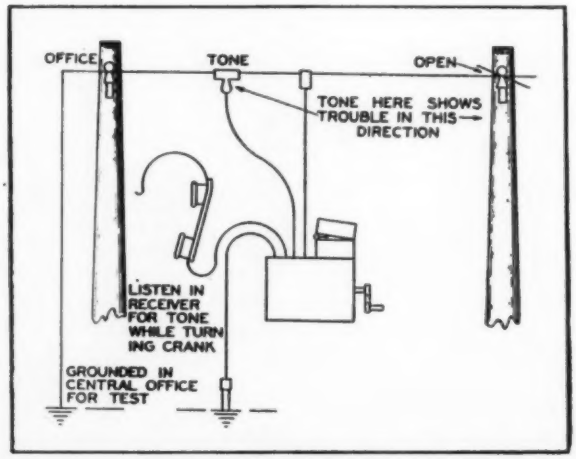

OFFICE
TONE
OPEN
TONE HERE SHOWS TROUBLE IN THIS DIRECTION
LISTEN IN RECEIVER FOR TONE WHILE TURNING CRANK
GROUNDED IN CENTRAL OFFICE FOR TEST

Fig. 2. Locating an open circuit.

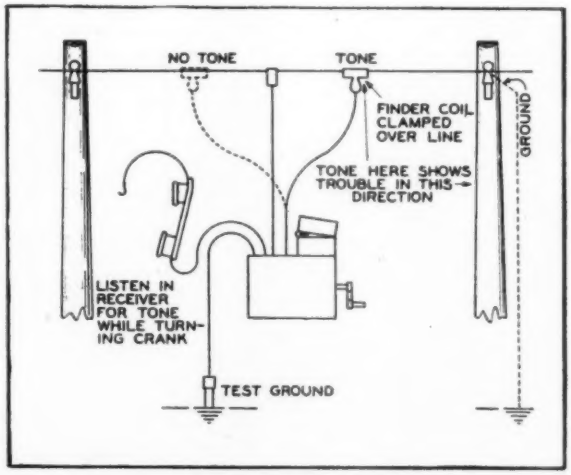


Fig. 3. Locating a ground.

explained in *Fig. 3*. The troubleman connects one line clip to the line and the other to a ground. Ordinarily, a guy wire can be used for this purpose or a ground rod may be driven. He then works toward the fault and when the tone fades out, it is an indication that the trouble has been passed.

Location of a Cross Between Two Lines. The use of the test set for this purpose is explained in *Fig. 4*. The troubleman moves one clip from wire to wire to detect which wires are crossed. The test is repeated as described above and when the cross is passed, the tone fades out.

Location of High Resistance Splices. This test is conducted in the manner indicated in *Fig. 5*. The line clips are attached to the wire on each side of the splice. A shunt consisting of a fairly heavy copper wire then is connected across the splice. If the splice is high-resistance, current will flow through the shunt, and the finder coil clamped onto the shunt will pick up a tone. If the splice is good, a tone will not be heard in the receiver.

Location of a Defective Ground. This test is explained in *Fig. 6*. Two test

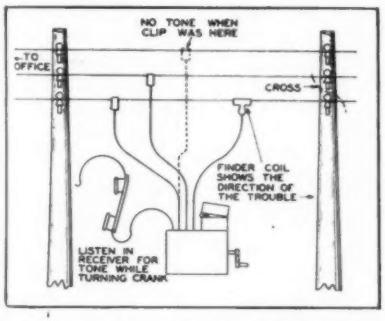

NO TONE WHEN CLIP WAS HERE
TO OFFICE
CROSS
FINDER COIL SHOWS THE DIRECTION OF THE TROUBLE
LISTEN IN RECEIVER FOR TONE WHILE TURNING CRANK

Fig. 4. Locating a cross between two lines.

rods are driven into the ground at least 20 ft. apart and each at least 20 ft. from the ground under test. The test clips are snapped on the test rods and the finder coil is clamped over one of the test line cords. When the generator crank is turned, the strength of the tone is noted. One line clip is connected to the ground rod under test. The tone again is noted and compared to that previously heard on the two good ground rods. If this tone is weaker, there is a high resistance to ground associated with the rod under test. If the tone cannot be heard, the circuit is open.

The Voltmeter

The voltmeter with a battery in series may be used to advantage in making a variety of rural line tests. The voltmeter also is useful in determining the nature of trouble on a line. When all the bells on a magneto line are connected with a condenser in series,

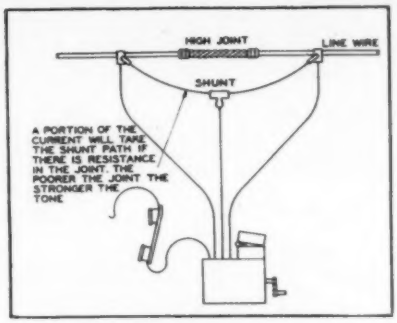

HIGH JOINT
LINE WIRE
SHUNT
A PORTION OF THE CURRENT WILL TAKE THE SHUNT PATH IF THERE IS RESISTANCE IN THE JOINT. THE POORER THE JOINT THE STRONGER THE TONE

Fig. 5. Locating high resistance splices.

the voltmeter may be used to detect the slightest leak, either across the line or from either side of the line to ground. When the line is clear, only a capacity kick will be had as the voltmeter is connected across the line and reversed rapidly.

The voltmeter with battery in series may be connected across the line to detect a short circuit or from either side of the line to ground to detect a ground leak. The voltmeter also may be used to detect foreign potentials on a line. The wire chief's test set is equipped with keys which make the various voltmeter connections, although this is not an absolute necessity as a portable meter can be used to make necessary tests on rural lines.

A dry cell battery may be connected in series. When using a voltmeter to measure resistance, the lower the resistance, the greater will be the deflection on the meter. In all cases, the voltmeter reading has the same ratio to the voltmeter resistance as the difference between this reading and the test battery voltage has to the line resistance. Therefore, before making resistance tests it is necessary that the exact voltage of the testing battery be known.

The line resistance then may be determined by dividing the difference between the testing battery voltage and the voltmeter reading when connected to the line by the last named reading and by multiplying the result by the resistance of the voltmeter.

As an example, assume that we are

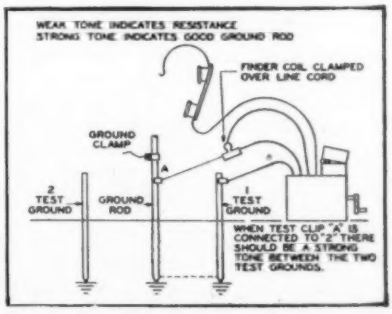

WEAK TONE INDICATES RESISTANCE
STRONG TONE INDICATES GOOD GROUND ROD
FINDER COIL CLAMPED OVER LINE CORD
GROUND CLAMP
2 TEST GROUND
GROUND ROD
1 TEST GROUND
WHEN TEST CLIP "A" IS CONNECTED TO "2" THERE SHOULD BE A STRONG TONE BETWEEN THE TWO TEST GROUNDS.

Fig. 6. Detecting a defective ground.

using a 3,500-ohm voltmeter, a testing battery with a potential of 42 volts and the voltmeter reading is 25 volts. The resistance being measured will be:

$$\frac{42-25 \times 3.500}{25} = 238 \text{ ohms.}$$

When desired, a set of curves may be made up for each voltmeter used from which resistance may be read direct. Due to the fact that the voltage of the test battery will vary slightly with age, it would be necessary to prepare several curves representing different voltages and using the one which would apply.

Ohmmeters

This instrument reads resistance direct and will be found accurate enough for general rural line testing. It also is small and may be carried conveniently by the troubleman when he is out on the line. Various scales may be provided, for example, 0-10, 0-100, 0-5,000 and 0-50,000 ohms. The dry cell test battery usually is mounted inside the case. An adjustment for a variation in battery voltage is provided. This instrument may be used effectively to measure the resistance of a line, the in-

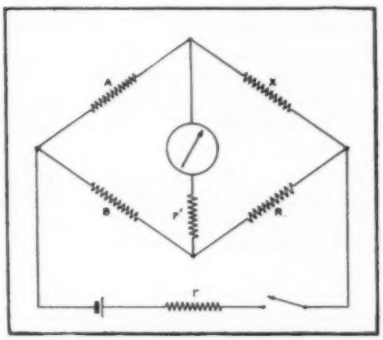
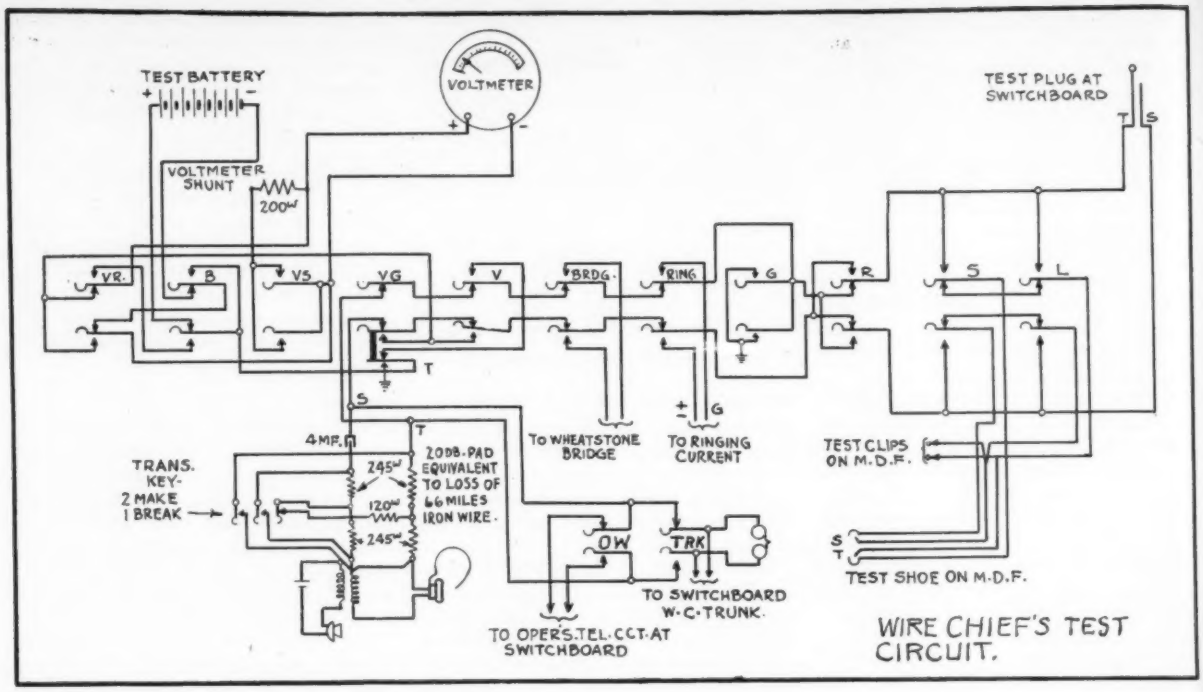


Fig. 7. Simple Wheatstone Bridge Circuit.

sulation resistance between line wires or between line and ground.

Tests for Grounds. To read the meter deflection one must connect one test lead of the meter to ground and the other to the line. The line must be opened at some convenient point in order to note whether or not the meter reading changes. The troubleman should proceed along the line, clearing suspected grounds until the meter reads clear.

Tests for Short Circuits and Crosses. To test for a short circuit on a pair or a cross between wires of different pairs, the test leads from the meter must be connected to the wires affected. Similar tests should be made at convenient locations along the line. Increase or decrease in resistance will indicate whether or not the troubleman is traveling toward or away from the trouble.



One version of the standard wire chief's test circuit.

The Wheatstone Bridge

For those who have need for the more accurate measurement of unknown resistances, the Wheatstone Bridge is recommended. While the bridge usually is considered quite complicated, in reality its principles and application are quite simple. Briefly, these principles consist in matching the fall of potential across an unknown resistance X with the fall, across a known resistance R as indicated in *Fig. 7*. This matching is simplified by the use of resistance A and B which together form a ratio, that is, 1 to 1, in which case the unknown resistance X equals the known resistance R.

There is no need for anyone having any fear that he will experience difficulty in the use of the Wheatstone Bridge in locating rural line trouble. The instructions furnished with each instrument by its manufacturer will explain in detail just how the various tests are to be made. In most cases, it proves better to use a voltmeter to determine the nature of trouble when a bridge is used to make the actual location.

Transmission Test Set

The transmission test set for rural line use considered in this article consists of a 1,000-cycle oscillator and a decibel meter. These instruments provide a means of making actual quantitative transmission tests over lines as well as tests through repeating coils and other station and central office equipment.

These tests, if properly used, will prove valuable in rendering good rural line service. For example, the 1,000-cycle oscillator can be placed on a line in the central office and readings taken at various points along the line with a decibel meter. These readings can be recorded and referred to later on a comparative test. Also, wet weather transmission over a line may be compared to its dry weather transmission qualities. Also, tests made with these instruments often disclose defects which will not be detected by the usual direct current testing methods.

Dry Cell Battery Testing

One common error which should be avoided is the testing of telephone dry cell batteries with cheap pocket ammeters. In all cases batteries should be tested with a standard telephone dry cell tester. These testers are voltmeters with a 0-1.5 scale shunted by a resistance of $6\frac{2}{3}$ ohms. The output voltage of the cell under load is indicated when the tester is placed across a single dry cell. When the voltage of a dry cell drops below 0.93 on a test of this type it should be replaced with telephone dry cells and not ignition type batteries.

Milliammeters for Transmitter Tests

Transmitter testing, if properly conducted, will prove most useful in the detection of defective transmitters or dry cell batteries used on rural telephones. The milliammeter should be connected in series with the transmitter and the deflections noted while talking. A transmitter suspected of being defective can be checked against a standard specification by using one known to be good. A milliammeter with a scale of about 0-250 should be used for this purpose so it will not be injured when a transmitter packs.

Miscellaneous Tests

Partial open circuits and cutout trouble perhaps are the most annoying to subscribers and also the most difficult for troublemen to locate. Broken strands of tinsel in telephone cords often cause this type of trouble. Loose connections in the battery circuit are also a common cause of noise. One good method of testing to locate this type of trouble is to use a buzzer powered by a dry cell. This buzzer is hung on the mouthpiece of a telephone which causes it to be heard clearly in the receiver. Then by moving cords or suspicious connections, cutouts may be clearly detected and located.

When other instruments are not available, some tests can be made with a magneto test set. The presence of a ground or short circuit may be detected by the pull on the hand generator. The line must be opened, however, to detect the direction of trouble, a practice never to be encouraged. It also must be noted that tests of this

(Please turn to page 68)

LOOK TO LEICH FOR THE RIGHT TELEPHONE FOR EVERY RURAL LINE REQUIREMENT....

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USITA RURAL COMMITTEE

Making Detailed Survey

By R. A. LUMPKIN
Chairman
USITA Rural Telephone Service Committee

ANY discussion of the rural telephone problem should start with a clear understanding of a few simple facts. *First,* there actually are less farms without telephone service today than at any time in the industry's history.

Second, despite the limitations imposed by the demands of war, telephone service has been installed on nearly 400,000 additional farms since 1940, making an increase of 500,000 farm telephones since the depression days of the mid-1930's.

Third, about 80 per cent of the farm families in the United States live along, or sufficiently near to, existing pole lines which permits them to obtain telephone service without a construction charge. Only about 60 per cent of this number, however, now are subscribers to the service available to them.

Fourth, although the percentage increase in rural telephones since 1930 has paralleled closely that of urban telephones, rural telephone service is not yet developed as far as the telephone industry would like to see it.

Fifth, telephone people everywhere, in general, are seeking ways and means to extend and expand rural telephone service on the basis of rates that are economically feasible to both the operating companies and their customers.

In recognition of the last two items above, the United States Independent Telephone Association established a Rural Telephone Service Committee. This committee not only is truly representative of the industry, but includes in its membership, men particularly qualified in specific phases of telephone company operations. They approach the farm telephone problem with a definite understanding of the many difficulties involved and the innumerable obstacles to be overcome. There are no magicians included in the committee's membership and no magic will be used to solve the problem. The committee's approach is being made on a thoroughly realistic and practical basis.

The committee has been impressed with the great variety of so-called factual data frequently based on census reports. It calls attention of all interested persons to a report of the Agricultural Department of the Chamber of Commerce of the United States, entitled "Variations in Farm Incomes and Their Relation to Agricultural Policies," published in March, 1945.

In addition to pointing out that the commonly accepted figure of more than 6,000,000 farmers in the United States was obtained by the use of an unsound definition of a farm and so provides an unreliable basis for the formulation of programs affecting the agricultural industry, the report emphasizes a need for more appropriate definitions of a farm. Also it points out that agricultural problems cannot be solved by over-all policies and programs applicable to all farmers.

Likewise, it should be pointed out that the rural telephone problem is not to be solved by over-all policies and programs applicable to all telephone operating companies. It is not the purpose of the USITA Rural Telephone Service Committee to devise a plan of procedures to be adopted by all Independent companies. The committee recognizes that in the final analysis each company must determine the plans and policies best suited for the solution of its own individual problem.

On the other hand, the committee can examine and report on a variety of methods successfully employed at present; it can take a look at probable future developments; it may take cognizance of the problems and changes in operating methods, contractual relations, etc., which such contemplated developments may bring forth.

If a solution to the farm telephone problem is to be found through improvement in the service rendered and its extension and expansion as the result of aggressive sales efforts on the part of operating companies, the steps which must be followed form a definite pattern.

First, telephone people must determine by customer surveys what particular features of telephone service their present and prospective customers desire. The easiest way to overcome sales resistance of any kind is to sell the customer what he wants.

Second, plans must be made to extend facilities to those desiring service; plans which will employ the most economical methods of construction if the objective of rates that are economically feasible to both the operating company and the customer is to be met.

Next, definite and specific plans must be set up for the modernization of present facilities and the improvement of the service in order to give the customer as near as possible the kind of service he desires.

Finally, telephone companies must see to it that farm people, both with and without service, are informed as to the availability of rural telephone service and are taught its great value in all phases of farm operations and farm life.

Thus, to begin with, the USITA Rural Telephone Service Committee confined its studies to three phases of the problem. Broadly speaking these are: (1) Facilities used in rendering farm service; (2) commercial problems involved; (3) methods of keeping tele-

phone people and the public alike informed as to the availability of farm telephone service, its many advantages, and the progress being made in its expansion and improvement.

Under the guidance of a special group within the committee, a nationwide survey is being conducted for the purpose of gathering statistical data on which can be based a report of present development, coverage and the number of potential customers. Early data received tends to verify previous estimates. Indications are that perhaps 25 per cent of the potential new customers can be served with existing facilities.

A number of telephone companies already have employed opinion surveys as a guide to improving the scope of rural service. In the form of questionnaires sent to users of the service, these surveys are designed to find out what customers think of their present service, the primary purposes for which it is used and what additional services they would like furnished. Customers are questioned about methods of paying bills, how frequently their telephone is out of repair, the kind of telephone that is preferred, etc. Certain very general questions are included as a gauge for determining the validity of the answers received.

Another survey, designed for nonusers, seeks to discover the reasons why such persons are not telephone company customers, indirectly points out the value of farm telephone service and provides a foundation for future sales work on the part of company representatives.

Customer surveys generally are used only for spot checking. Usually they are sent to no more than 10 per cent of the persons in an area from which information is being sought. It is interesting to note that about 75 per cent of the surveys sent out are returned with almost all of the questions answered. The committee is studying various surveys in order to report on the features most practical and best adapted to the Independent company situation.

Of course, this does not cover all of the work involved from a commercial standpoint. Many other phases are being explored. The surveys, however, are the first step in the pattern outlined above and we must base our other work upon many of the facts which they disclose.

Much of the problem relates to the facilities which must be used to provide service with particular emphasis on how costs of construction may be reduced. A facilities sub-committee actively has been engaged in this work since last December. Based on questionnaires sent to operating companies in the field, this sub-committee has in preparation, four separate reports as follows:

Report No. 1—Means of making extensions of wire facilities for rural service as inexpensive as possible.
Report No. 2—Means of improving facilities for rural service and operating methods.
Report No. 3—Proposed rural power line carrier telephone service.
Report No. 4—Consideration of possible new means of giving rural service.

In addition to covering rural line construction practices, programs and costs, the first report will deal with the possible application of small dial units to reduce the amount of outside plant required for rural service.

The second report will deal with present practices and will include a construction and maintenance manual for the use of service line organizations and the very small commercial companies.

The report on rural power line carrier will be divided into three parts: (A) Description, service characteristics and status and costs; (B) special problems associated with use of power line carrier and estimates of field of use; (C) program for further developments in work. The fourth report will deal with possible applications of radio as well as telephone line carriers.

Keeping in mind that each company must find its own solution to the rural problem, based on a knowledge of the best and most modern methods employed by other members of the industry, there remains but one other step in the pattern. The USITA committee, therefore, is studying the best methods whereby farm people can be informed about rural service.

Here the Telephone Advertising Institute is providing splendid cooperation. The publication of the committee's report will bring to light many interesting and striking facts which can be used to publicize both the availability of the service and its great value to the farmer. There already are available forms of attractive booklets which present the story in a most effective manner.

In addition to the matters which relate directly to the pattern outlined for the improvement and extension of rural service, the committee has found at least two additional problems warranting special consideration. Not only will such a program require the raising of additional capital funds, but will create new problems of management and operation. The committee is not overlooking either one.

A special group has been assigned the task of studying all available means of financing small companies and is investigating both government and private sources of funds. It already has been determined that direct loans can and have been made to telephone companies for the purpose of improving and maintaining plant by the Reconstruction Finance Corp. Apparently, such loans may include money to be used as working capital. In addition, the RFC recently announced plans whereby it will participate up to 75 per cent in loans made by local banks. The total amount of such loans must be not more than $250,000.

In announcing the RFC's twofold plan to aid small business, the Washington *Star* recently said, "The RFC board of directors feels that the program makes unnecessary the various proposals for postwar action by other government agencies to help finance small business."

Under the direction of the special committee group, studies have been made in two states where there is a substantial Independent operation of exchanges. The purpose of these studies is to determine where and in what amounts funds are being sought by companies operating less than 1,000 stations. Answers received to date indicate a surprisingly low demand for funds. In practically every instance those companies interested in loans at the present time express a preference for doing business with their local banks. Nearly all replies indicate that local banks are both able and willing to provide whatever funds reasonably are required.

The sub-committee, nevertheless, recognizes the need for a better understanding of the soundness of loans to telephone companies. It is approaching bankers, both individually and through their trade associations, and has found the banking fraternity both willing and eager to cooperate in a program being outlined. Included in the program is a uniform loan application and a standard form of mortgage to be used where such security is required in order to obtain needed funds.

Based on the studies made to date, the committee is of the opinion that many companies are not yet aware of the coming demands for capital when a postwar plan for rural expansion finally is inaugurated. It recognizes the need for informational work along this line and already is studying methods whereby the operators of small companies can be shown the probable turn in their business.

The committee has recognized many new problems of management and operation as the inevitable result of rural

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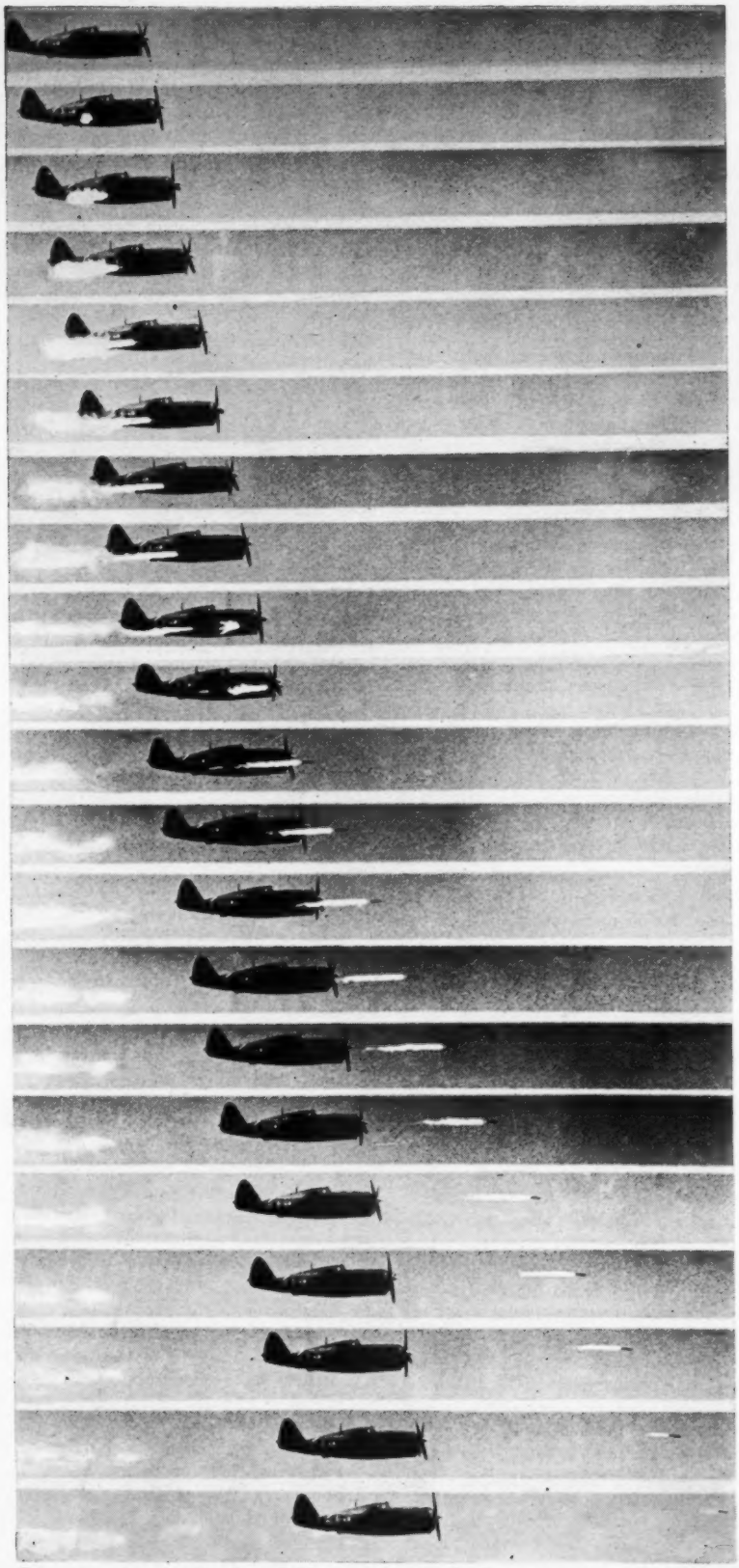

Succession pictures taken by a "ribbon frame" camera, showing a wing rocket getting under way and speeding toward the enemy at about 13 miles a minute. This camera was developed by Bell Telephone Laboratories.

Photographing a ROCKET at 800 miles an hour

ONE outstanding weapon of this war is the rocket, now used by our fighting forces on land and sea and in the air.

Scientists at Bell Telephone Laboratories had an important part in the technical development of this American weapon. One of their contributions was the "ribbon frame" camera which takes 120 pictures a second on a continuously moving film. It has proved of great value in studying rockets and shells in flight.

The ribbon frame camera is only one of many Bell Laboratories developments which are being turned against the enemy.

Our Laboratories are now wholly devoted to the war. When it is won, they will go back to their regular job—helping the Bell System give you the best telephone service in the world.

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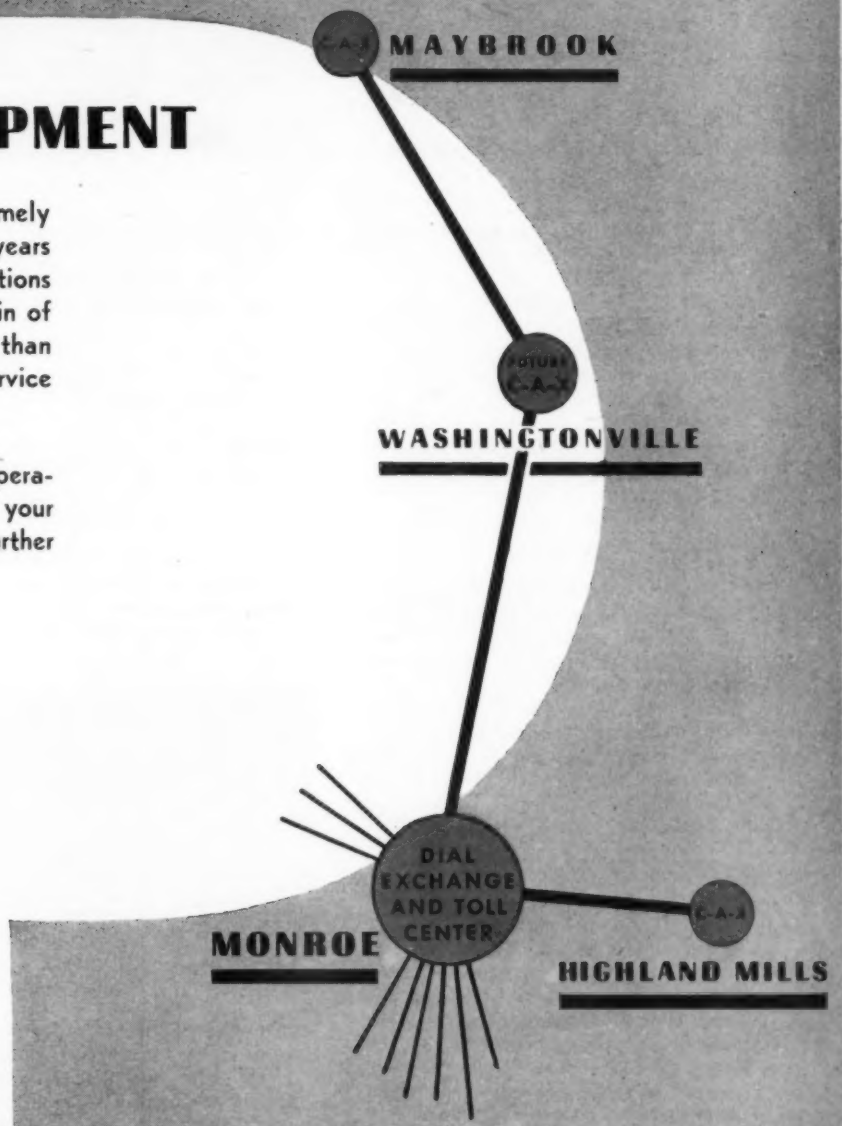

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THE PLANT MAN'S NOTEBOOK

BY RAY BLAIN • TECHNICAL EDITOR

ACCORDING to figures released by the Bell Telephone Co. of Pennsylvania, 43 per cent of the farms in its territory have telephone service. In Delaware, 37 per cent are served. Since 1935, the number of rural telephones has increased by about 80 per cent in these states. It is claimed that this increase did not just happen, but was the result of prewar sales and promotional campaigns to inform farmers of the advantages of telephone service.

* * *

It would seem that something worthwhile could be accomplished by introducing either a distinctive odor or color to nitrogen gas used in cable testing for trouble location. The odor or color of the escaping gas then could be used as a means of detecting sheath openings and locating trouble. This certainly would be easier to use and more effective than soaping the surface and watching for bubbles.

* * *

We have a report of a field trial where three different types of cable spinners were tested. There was considerable variance of opinion among the spectators as to which model was satisfactory, although the over-all results were notably beneficial. Apparently, all engineers are not of the same opinion as to the tension which should be placed on the spinner wire, although all are in agreement that the cable should be lashed firmly to the strand. The method of terminating spinner wire at the poles also is a disputed question, even though numerous methods, when tried, have proved most successful.

* * *

The new and improved walkie-talkie radio set developed by the Signal Corps is so treated that rain, or even immersion in water for short periods, will not impair its operating efficiency.

* * *

Now we learn that a manufacturer is making postwar plans to incorporate an electric organ, radio receiver and recorder in one instrument for home use.

* * *

There recently was made available for the telephone industry a new and complete solderless wiring kit which should solve many difficult problems.

This kit comprises a six-purpose precision installation tool which cuts and strips the wire, indicates stud sizes and crimps terminals to the wire with a compression arrangement. Also included in this kit is an assortment of 100 solderless terminals of the most commonly used types and sizes. Soldering is not required to make trouble-free electrical connections. Merely insert wire in the terminal barrel and crimp with the tool. There is no doubt that this kit will serve many useful purposes in the telephone exchange.

Recently the writer noted a point type transposition bracket listed as "right" and "left." We had not heard of this type of bracket and could not find anyone who could give a reason for its use. Everyone agreed that there is no good reason why all transpositions could not be made by the standard method of left-over-right. Finally, we learned that T. P. Brewster, superintendent of telegraph of the Atchison, Topeka & Santa Fe Railway Co. holds the patents covering this bracket so we wrote him for an explanation. Patent No. 2299960 reads as follows:

"Actual experience has shown that a non-transposed pair of wires can be transposed for 30 KC or a pair of wires transposed for 3 KC can be transposed for 30 KC by the right and left hand method at one-half the labor cost required to transpose under the old method which necessitates rolling in the transpositions, thus spiraling the wires around each other.

"By the right and left hand method, transpositions are installed without spiraling the wires around each other, thus a pair of wires or a circuit can be transposed or retransposed without tangling, cutting or damaging the wires.

"Transpositions installed in a circuit by the right and left hand method may be moved or relocated without cutting or tangling the wires or interrupting the service on the circuit. In other words the type of transposition sections may be altered without damage to the line wire or interruption to the circuit.

"Where circuits transposed by the old method of spiraling wires about each other are torn down in sleet storms, considerable damage is done by snarling of wires and much trouble experienced in untangling and restoring them to their proper transposed arrangement. Under the right and left hand method of transposing, the wires can be easily and readily straightened out and restored without damage, with a minimum loss of circuit time, and

with the added assurance that the transpositions are all intact."

This in layman's language, as we understand it, means you throw a buck in a pair of wires and tie in a right hand transposition. Then you reverse the wires to the point where a second transposition is required, which is tied in on a left hand bracket. This leaves the wires straight and normal on both sides of the operation and two transpositions have been placed in the line without cutting or splicing any wires. The idea appears to have considerable merit on certain types of communication lines. What do you think?

* * *

There is a rumor that a lightweight operator's headset of a new design is to make its appearance soon after the war. It is understood that this headset is to be suspended from the headband and will eliminate the breast type transmitter now suspended from the operator's neck. This type of transmitter has proved bothersome and many operators do not like the neck band. Also, when an operator turns her head, not speaking directly into the mouthpiece, transmission losses are experienced.

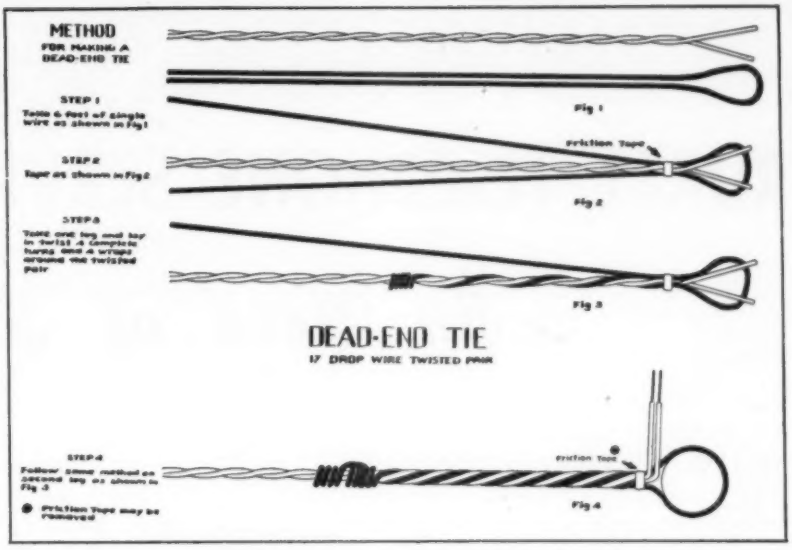
It is believed that this new design may be similar to a headset which has been used with success by the armed services for several years past. It is of the double headband type with a receiver on one side and the transmitter on the other. The mouthpiece is a horn type which extends around to a position in front of the operator's mouth. The advantage of this arrangement is that the mouthpiece turns with the operator's head and she always will speak directly into it. This will improve overall transmission. Also, this design is easier to put on and take off than the neckband type. It seems odd that this design has not appeared sooner in the civilian communication world.

* * *

Signal Corps men charged with the maintenance of the 2,000-mile telephone line along the Alaska Military Highway have calculated that the line is 2.16 miles longer on the hottest summer day than it is on the coldest day of winter.

* * *

A meeting of the American Institute of Electrical Engineers was held at the Philadelphia (Pa.) Engineers Club recently at which was discussed "The History and Development of Train Communication." An interesting lecture was delivered by Dr. L. O. Grondahl who outlined the various systems which have been tried. He described in detail the inductive system which is being installed on a large scale on the Pennsylvania Railroad main line between Harrisburg and Pittsburgh; 275 locomotives, 90 cabooses and 6 wayside stations are being equipped. The auditorium was very crowded. It is surprising that such a large number of engineers are interested in this type of communication.



The above drawing shows an approved method of making drop wire ties.

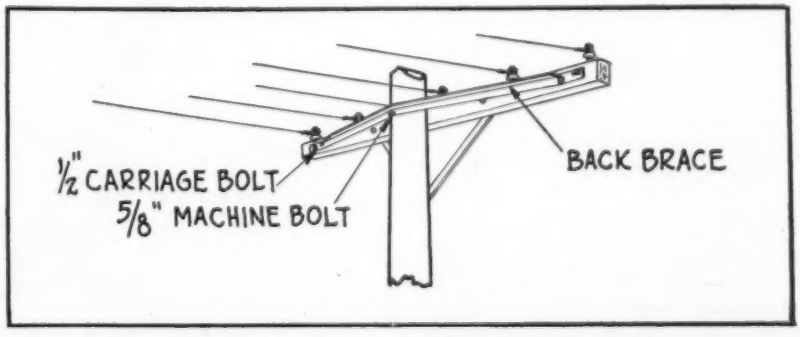
* * *

The Southwestern Bell Telephone Co., St. Louis, has just completed plans for a $140,000,000 special postwar construction program. The contemplated expenditure will be in addition to the money regularly spent for the normal growth of the business and will result in a net increase of about one-sixth in the company's present plant investment of $441,000,000. Of the total amount, about $34,000,000 will be spent in expanding and improving communications in Missouri, about $10,000,000 in Arkansas, $20,000,000 in Kansas, $22,000,000 in Oklahoma and $53,000,000 in Texas.

The Southwestern plan is part of the Bell System's proposed billion-dollar long-term construction program. Carrying out of the plan will depend on general business conditions and the availability of manpower, materials and investment funds. Approximately 10 years will be required for completion of Southwestern's program, it was stated.

* * *

Now we hear a new theory of why squirrels eat lead cable. Our informant claims that the teeth of a particular squirrel grow too fast and he learns that he can grind them down by gnawing on lead cable sheath. However, when he gets the grinding job done there are several holes in the cable. This confirms the belief of many that one outlaw squirrel usually causes all the trouble in a particular exchange and when it is killed, further trouble is not experienced.



Approved method of installing a back brace for dead-ending of open wire lines and suitable for rural line use.

RURAL TELEPHONE SERVICE

In Need of Streamlining

By I. E. WILSON

[Editor's Note: *I. E. Wilson, a practical farmer, is manager of the Cummings Estate Farms consisting of approximately 15,000 acres located in the Illinois and Mississippi river valleys.*

He grew up on a farm south of Springfield, Ill., and was graduated from Illinois Normal School in 1906, after which he took special courses in soil and crop work at the universities of Kansas, Illinois and Wisconsin.

Mr. Wilson not only is well-known in agricultural circles, but also is well-known in educational, church and other community work in Pekin, Ill., where he has lived for a number of years. He at one time was principal of Pekin High School where he established a vocational course. For 25 years he has been a director of the high school board, 10 years of which he served as president.]

* * *

ABOUT 90 per cent of my time is spent in the open country, working with farmers and their farms, and the many perplexing problems which arise in connection with agriculture. It is only natural that my attention is drawn to the things which aid me and those whom I am attempting to help. Good communications for farm areas is one of these things.

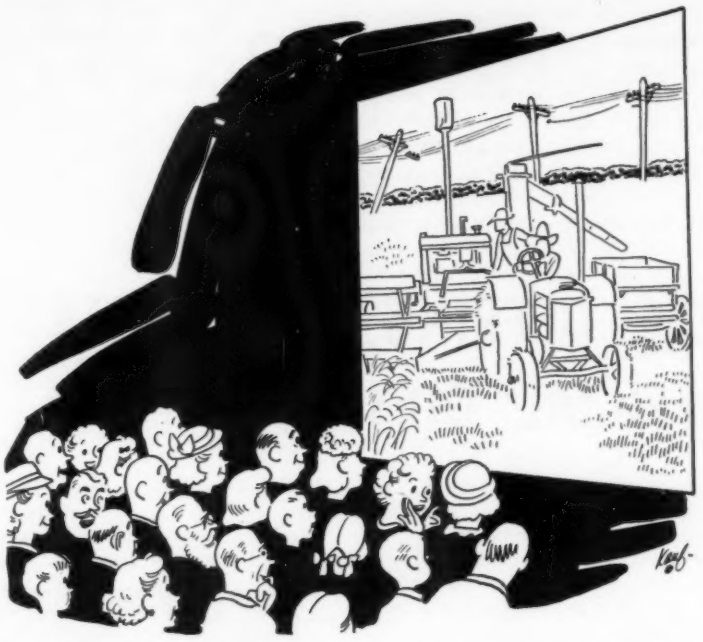
We have seen the passing of many good old practices. The old horse power, with its steady grind of 10 or 12 horses plodding 'round and 'round, seems to have been silenced forever. And, alas, as we drive through the peaceful countryside, we are grieved at the absence of the golden-colored and well-rounded strawstack which always has been such a haven of joy to little children as they clamber and slide and play hide-and-seek; the lowly cow as she basks in the health-giving sunshine, well protected from the cold North blasts, or the grunting porker as he roots his way under the scattered chaff and takes his place beside his brothers, where he, too, will defy the chilling December night.

Where is the husking bee with its competitive joy and laughter? The steaming aroma that comes from the sputtering kettle of rich brown apple butter as it slowly simmers to a luscious consistency? What has happened to the long line of husky porkers dangling by the hind feet from the old butchering pole, soon to be converted into sausage, bacon, hams and the lard that will be used in the long awaited doughnuts or crusts of pumpkin pie?

Yes, we have seen many of these good old country practices pass and the communities have scattered. What has caused it? Some one came along and showed the farmer better ways. Canning companies now are turning out the apple butter; bakeries, the doughnuts, and the commercial slaughter house has deprived farmers of their good times at the community butchering.

Some one showed him the many advantages of the steam engine with all

The farmer is as close to his veterinary as he is to his telephone.



". . . How many times could this big piece of investment be kept moving if a telephone were available to call for repairs, instead of losing valuable time, at additional expense, to drive long distances for them?"

its power and speed. Showed him how quickly and efficiently it separated the golden grain from the straw. But the giant steel horse soon was assigned to its place in seclusion, and progress allowed to march on. Some one conceived the new idea of harvesting and threshing grain at the same time. This would do away with the expense and drudgery of shocking the bound grain. It also would avoid the long and dangerous period of the grain standing in the field exposed to all kinds of weather hazards.

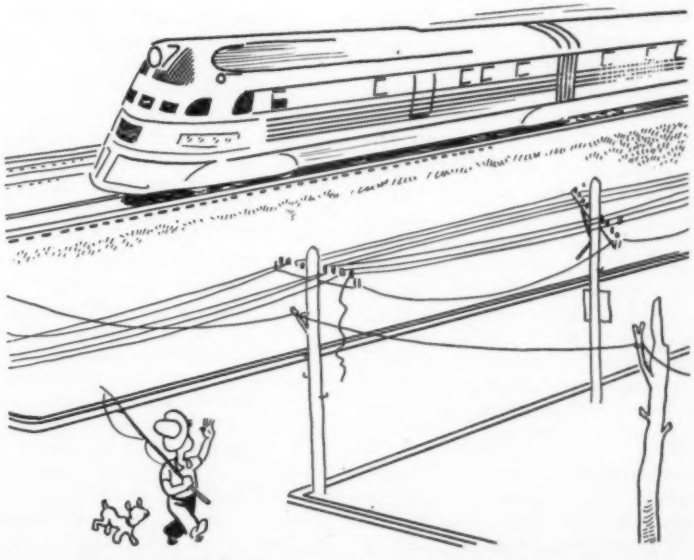
Roll upon roll of films were made by the implement companies to herald the new idea. Farmers and their families were called together to see the great contrast. The pictures showed field after field of grain spoiling in the shocks. They showed the toilsome task of shocking the heavy grain. Then, in contrast, they saw the smiling driver of a new invention, slicing off strip after strip of grain, cutting and threshing all in one process. Boys were laughing at the antiquated idea of laborious grain shocking and mother stood by smiling as she saw relief from the very trying task of standing over the roaring hot cookstove preparing meals for 20 or more threshermen. Was it any wonder these simplehearted people were taken by storm over this new idea?

So the combine was ushered into the farmers' lives through someone's special effort. What did it? Salesmanship. The moving picture paved the way. Some enterprising company saw the opportunity and took advantage of it in its sales program among farmers.

Day after day, films and advertisements showing homes being devoured by raging flames are seen. Inmates of the homes are shown panic-stricken because there is no insurance to protect that home. How many times do we see the grief-stricken family wondering what it will do when death takes the breadearner—the father—from its midst? The insurance companies, through visual and other means, have impressed upon us very vividly the great necessity of their ware, the insurance policy, a haven of security in the time of dire need.

You may wonder why all this should be told to telephone men. It is told because it seems to me, as a farmer, Mr. Telephone Man, that you are missing golden opportunities to advertise your most valuable service.

I have referred to the various occasions mentioned above to show you that the farmer is just as susceptible to advancement as any class of people, and I am sure advancement in telephone service would strike a responsive chord in the rural districts. Good, efficient service is as much appreciated in the country home as any place in the world. The telephone is so very essential in our present day needs and routine that, on first thought, one would wonder why it is at all necessary to give it any publicity. Also, our state and national highways are essential, and we might wonder why it is necessary to advertise them. Yet, we continually see such publicity as "The Lure of the Open Road," "See for Your-



". . . Imagine a streamliner going out on a run with smears and streaks of paint all over the sides of the coaches; window after window broken out and replaced with pieces of burlap sack or big sheets of cardboard."

self," "Climb Mountains for Health" and "Where the Wily Trout Lurks." All these have a tendency to induce travel.

I mentioned above the advent of modern machinery. How many times could this big piece of investment be kept moving if a telephone were available to call for repairs, instead of losing valuable time, at additional expense, to drive long distances for them?

How many homes might be saved from the ravages of fire if a telephone were available?

We know so well the great necessity of quickly securing the services of a physician in cases of severe accidents. Many times in the movies we see how children are run down by autos. These pictures usually are promoted by insurance and auto companies. They make us insurance conscious. I fail to see similar things which make us telephone conscious. We see film after film showing the graceful streamliner gliding along over prairie and through mountain gorges, around the revealing curve and on the straightaway, all of which makes us streamliner conscious.

Driving through the country, I see many things on rural telephone lines that are anything but a good advertisement. Wires anywhere from sagging to resting on tree limbs, supported by thickly-growing brush, hanging on some farmer's fence post, or even lying on the ground, or dangling in the wind, broken into pieces. Now and then I see a pole that has been split by lightning, leaving the arms and wires to hang as best they can. Another pole has been burned off at the base and is held up only by the wires which are pulled out of place. Down the line a few spans is a native pole, crooked or otherwise, which makes a sorry looking substitute. These things advertise everything that should not be advertised.

Imagine a streamliner going out on a run with smears and streaks of paint all over the sides of the coaches; window after window broken and replaced with pieces of burlap sack or big sheets of cardboard. No, we do not see such things, either in reality or in films. Instead, we see the acme of perfection, the pleasing and satisfying, the impression of thrift and service.

What a pleasure to see the array of fine purebreds at county, state and national fairs and shows, usually emphasizing some special breeds, such as Holsteins, Jerseys, Percheron Association, Chester Whites, or some other progressive breeder's association. They have grabbed the opportunity, displaying it in a film where folks can see and enjoy their accomplishments, and, as a result, be persuaded to recognize a better way of breeding.

Possibly I am out of line, however, this is not a note of censure. It only expresses the observation of one who never was a telephone man. But I do know one of our farms with clean and well-painted buildings, brushless fence row with good wires on well-set posts, always is an attraction to a good tenant, the kind we all like.

A privately-owned telephone line, wrecked and out of service, always is bad, even for the well-kept system. It may sound the signal for some kind of consolidation, but that is the problem of the organizations concerned. I only hope I have said or suggested something that may arouse a new line of interest in your great service to humanity.

C. C. DEERING, PAST USITA OFFICIAL, DIES

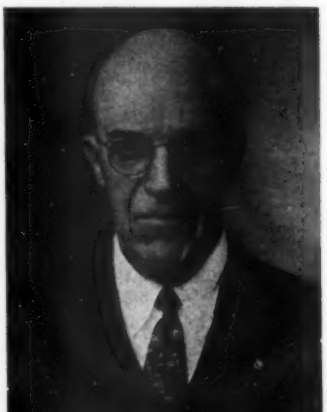
CHARLES C. DEERING, 74, Des Moines, Iowa, dean of state telephone association secretaries and past secretary-treasurer of the United States Independent Telephone Association, passed away May 17, following an extended illness. He had been in a Des Moines hospital since January. Mr. Deering was born November 29, 1871, in Moingona, Boone County, Iowa.

One of the most popular executives in the telephone industry, Mr. Deering had served the Independent branch of the business for 49 years in both the operating and association fields. Probably no other individual has given more time or has been more active in promoting the welfare of Independent telephony. His service and aggressive leadership will be a great loss to the industry.

Mr. Deering, at the 1944 national Independent convention, retired as USITA secretary-treasurer because of ill health, a post he had held for 24 consecutive years. In November of that year, the USITA presented him with a parchment scroll containing a tribute in recognition of his long and faithful service to the association and the Independent industry as a whole.

His association with the telephone industry dates back to 1896 when he worked for the Boone County Telephone Co. He started at the bottom with this company, and in 1899 was elected secretary, the following year being named secretary-manager. He remained with the Boone County company until 1903 when he became superintendent of the Mutual Telephone Co. of Des Moines, Iowa. From 1905 to 1907, he again served as secretary-manager of the Boone County company, and from 1908 until 1912, was general manager of the Long Distance Independent Telephone Co., Omaha, Neb.

Mr. Deering's association work began in 1900, when he became secretary-treasurer of the Iowa Independent Telephone Association, which post he held at the time of his death. In those



C. C. DEERING

early days, this post was not a salaried position, and its functions were carried on in connection with Mr. Deering's duties in the operating field. From 1913 until his death, however, Mr. Deering held this position as a full time job. He had been president of the Independent Telephone Clearing House, Des Moines, Iowa, since its organization in 1906.

In 1920, he became secretary-treasurer of the USITA, holding that post until his resignation in 1944. In 1906, Mr. Deering also was secretary-treasurer of the old International Independent Telephone Association, a predecessor of the present USITA.

Mr. Deering is survived by one daughter, Frances Deering Stocking; a son, Lieut. Charles C. Deering, Jr., and two grandsons.

A TRIBUTE TO OPERATORS

In Rural Communities

By MAYME WORKMAN
Traffic Editor, TELEPHONY
Traffic Supervisor, Illinois Telephone Association

A SHORT time ago, a friend of mine sent me a book, just off the press, entitled *Party Line*, by Louise Baker, published by Whittlesey House, New York City. Glancing through the pages, and looking at the illustrations, by Stephen J. Voorhies, the contents appeared so enticing, I could hardly wait to begin reading the story. Now that I have read the book, I can recommend its reading to all small telephone company operators, telephone employes who were in the service in the so-called early or pioneer days, and to newcomers in our industry who, like my friend, probably would say that some of the stories about the old maid operator, the principal character in the story, "are a bit tall for belief—that some of the details are too 'pat'—ever to have really happened."

The story is purported to be true and from observation and experience, the writer agrees with the author. The incidents described could, and no doubt did, happen—not only in the telephone exchange in the small town of Mayfield, Calif., but in many other central offices located in small towns and rural communities throughout the nation.

Miss Elmira, the switchboard operator in the story, at her retirement dinner honoring her for 43 years of faithful service to the telephone company and the town, was presented with a watch by the mayor who stated, "It was bought with pennies and nickels and dimes and dollars from the whole town, and we want you to know that it is only a small symbol of the affection and love with which we all hold you in our hearts."

Miss Elmira, described as "a thin, aged, retired telephone operator," was no orator, according to the story, but her words rang sincere and true as she responded and told the townspeople "she loved them." She said, "It has been my privilege for the past 43 years to have my ear on the heart of this town and I shall never forget what I heard." The latter part of this statement might have caused some uneasiness if her friends had not remembered, as the story stated, "that Miss Elmira had 'her' ethics."

Miss Elmira's retirement, on pension, was the result of a dial conversion. While the improved technical service, no doubt, is appreciated by the people in this small community, they miss the voice and friendly service dispensed by Miss Elmira.

The writer recently visited some small Illinois central offices—and I do mean small. One office had 37 lines. The switchboard was fastened to the wall and each line was equipped with a bell and drop. When the drop fell, the bell rang and the operator knew from the sound of the bell which line was signaling her. The operator, a friendly elderly lady, was pleased to have a visitor. She explained the operation of her switchboard, and especially was proud of a handset telephone which had been connected with her board for use in answering her subscribers. The switchboard was installed in her home, and what a comfortable, tidy and inviting home it was. She is the only operator. Friday afternoon is her afternoon off. During this time her switchboard is unattended. Also, she works only two hours on Sunday.

Like many operators in rural communities, she, unconsciously perhaps, personifies the "Spirit of Service." Her calls are answered promptly and it is evident that she enjoys her work. She takes a personal interest in her subscribers—their joys and their sorrows—and is ever ready to lend a helping hand.

The switchboard operator in a rural community renders more than telephone service. She keeps track of the doctor—there is usually only one—she awakens people in the morning. If she has a call for a subscriber she usually locates him, wherever he may be—perhaps to his embarrassment at times. She knows all of her subscribers personally, their habits, background, financial status, all the things people living in large and metropolitan areas frequently refer to as matters coming under the heading of personal business.

The operator in the rural community is not possessed with more than the average woman's curiosity. The fund of information she acquires concerning the people in her community, particularly her subscribers, is not a matter of curiosity. She considers it a part of her duty and responsibility to keep in touch with their affairs and activities. How else could she be of service to them?

As an example, a mother calls the operator in the rural community and says, "Oh Mary, Johnnie just swallowed a button. Can you locate Dr. Smith for me? Hurry, please!" The operator knows that Dr. Smith had a call from Hendersons a short time ago, and she probably can reach him there. She says, "Don't you worry, Mrs. Brown, I'll locate the doctor and send him right over." She rings Hendersons, reaches the doctor and he is on his way to attend little Johnny, pronto. If the operator didn't take a personal interest in her subscribers and their activities, little Johnny might have had a long wait while the operator tried to locate the doctor.

Mrs. Johnson calls the operator and says, "Mary, have you seen Jim pass

(Please turn to page 67)

ABC of the Telephone

By FRANK E. LEE

PART XI. The Ringer Theory. The 10th article in this series appeared in the May 19 issue, page 13.

MANY and varied types and styles of ringers have been developed and placed in service. Some ringers will operate on alternating current only. Others will operate only on ringing current of a special frequency and are known as harmonic ringers. One of the most common is the polarized-biased type. An understanding of the theory of the polarized-biased type will give a working knowledge of practically any other type of ringer.

Fig. 1 illustrates the principle of the polarized-biased ringer. This is a combination of a permanent magnet and an electromagnet. Compared with the receiver previously described, one of the main differences lies in the fact that the ringer coils are wound on iron cores which are securely fastened to only the south pole of the permanent magnet. The north pole of the permanent magnet is supported by the heel plate fastened to the signal case, however, its free end does not come in metallic contact with any of the other parts of the ringer.

By connecting the ringer coils securely to the heel plate, the permanent magnet establishes south poles at the free end of each coil. The armature, to which the clapper arm is attached, is hinged near to the north pole of the permanent magnet. This causes the armature to have a north pole at each end while the center is the south pole. Therefore, it can be said the armature is a piece of soft iron with three poles; one at each end, and one in the center induced by the action of the permanent magnet.

The biasing spring holds the armature nearer to one pole piece than the other. To ring the bells of the ringer it is necessary for the clapper arm to swing back and forth between the two bells and by alternately striking one and then the other in rapid succession a penetrating ringing tone is produced.

If current is caused to flow through the ringers in the direction shown in *Fig. 2*, the south pole of the right hand coil will be strengthened considerably and the strength of the left hand coil south pole will be weakened, neutralized, or reversed, depending upon the strength of the energizing current. The armature will be attracted to the right hand coil and repelled from the left hand coil. The effect of the biasing spring will be overcome and the clapper will move to the opposite side and strike the left gong.

When the current is removed from the coils, the magnetic relations in the ringer will return to the original state and the biasing spring will pull the armature back to its original position *(Fig. 3)*. See page 54. In so doing, the clapper will strike the right gong and cause it to ring. If the current impulses energize the coils in rapid succession the bells will continue to ring.

When alternating current is supplied from the generator, the magnetizing effect of the alternating current will cause the armature to be attracted to

FIG. 1 ↓

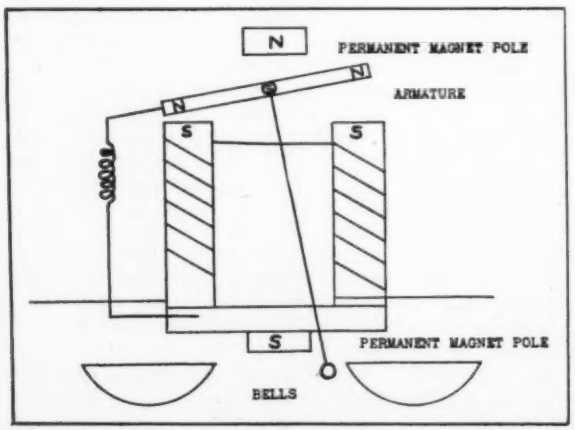
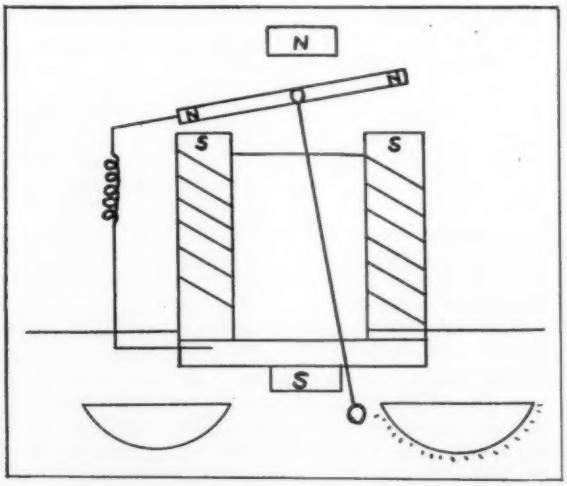


FIG. 2 →



"No Experience Necessary"

That's a phrase we're borrowing from the "Help Wanted" columns, for it certainly applies to Bethlehem's new serving tool . . . a tool so easy to use that any lineman can learn to handle it in a few minutes' time.

As the illustration shows, the device makes possible a neat, tremendously strong serve by means of the dead-end coil method. Using a 10-foot coil of 11-gage bethanized dead-end wire, the lineman hooks one end in place on the strand; then, engaging the wire between the fingers of the serving tool, he wraps it solidly in place with a simple rotary motion. Exhaustive tests have proved conclusively that the serve holds beyond the useful strength of the strand.

After a little practice, the lineman can make his serve in about the time required to attach conventional clamps. Besides, this serve is considerably more economical than the clamp method, for a coil of the necessary wire costs less than even a single inexpensive clamp.

The serving-tool technique is especially recommended for use with *bethanized* strand and wire—manufactured by Bethlehem Steel Company. One reason is that the highly ductile, uniform bethanized coating (almost 100 per cent pure zinc, applied electrolytically) is not displaced to any harmful extent by the operation of the serving tool. Moreover, when bethanized strand and dead-end wire are used, there is no question about the holding power of the serve.

Write for more details—or, better still, ask the nearest Bethlehem representative to explain this simple, effective technique.

★ ★ BETHLEHEM STEEL ★ ★

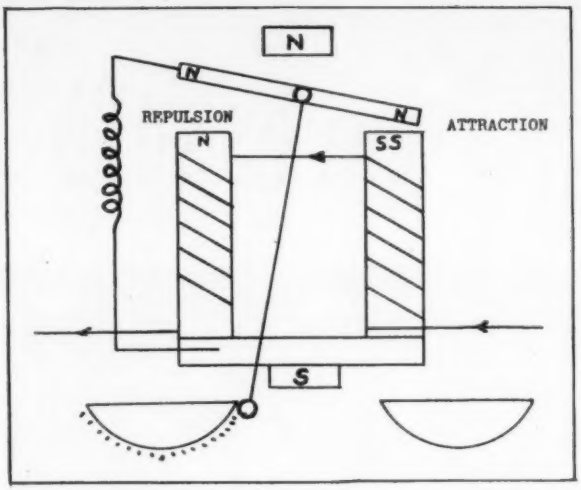


FIG. 3

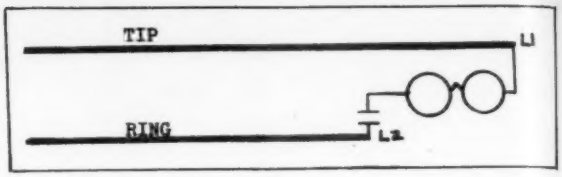


FIG. 4

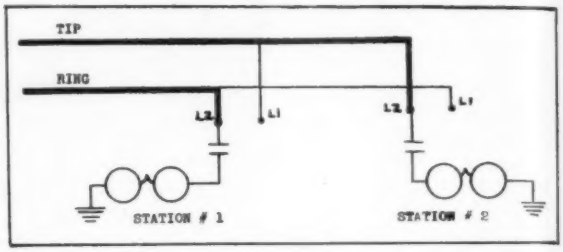


FIG. 5

first one coil and then the other, without the use of a biasing spring. However, a biasing spring would be necessary to place sufficient tension on the armature to keep the bell from tapping when the line was being connected or disconnected from the central office battery.

When a pulsating direct current, either positive or negative, is applied to a circuit in which a condenser is in series with a ringer, the alternate charging and discharging of the condenser will cause the ringer to operate. In this instance the energizing effect of the current flowing from the condenser attracts the armature and the biasing spring brings the armature back to normal during the intervals of current flow.

Where a common battery system is in use, the ringers on individual lines are connected directly across and the subscriber line in series with a condenser *(Fig. 4)*. The ringing current is supplied from the central office over the ring side of the line. The circuit is completed over the tip side of the line, hence this circuit is known as a metallic ringing circuit. The condenser opens the line to direct current, therefore, the circuit for the line battery is not complete until the receiver is removed from the switch hook.

When the telephone is in operation, the ringers are connected across the line, however, their high impedance to the voice current prevents any interference with the operation of the receiver and transmitter.

To ring one station only on a two-party line *(Fig. 5)*, station 1, or ring station, is supplied with generator electromotive force (EMF), over the ring side of the line and the ringers are connected from the ring side of the line through a condenser to ground. (See station 1.) The generator for station 2 is sent out over the tip side of the line and the ringers at station 2 (the tip station) are connected to the tip side of the line through a condenser to ground.

In rural areas where there are a number of telephones on the same line, sometimes as high as 16 or more on one circuit, all of the high resistance ringers are connected across the line, or, if a grounded line is used, from the line to ground. Naturally, all of the bells ring at one time and a system of codes has to be established in order that the subscriber answer only his own ring. Often when the bells on one of these lines ring, several other people also lift the receiver to listen in.

Because of this practice, some operating companies have placed an attachment on the switch hook of each telephone. This attachment enables the persons listening in to hear conversations on the line without noise from their own houses being carried out on the line. When the subscriber desires to talk over the transmitter, the catch may be released and the normal operation of the telephone takes place. This catch has the economic advantage of saving battery because the transmitter circuit is open until this latch on the switch hook is released.

Fig. 6 is a typical substation ringer with all of the parts named. From this picture it will be seen that the permanent magnet is supported by a single screw to the heel plate. The north pole of the magnet clears the armature and the frame of the ringer. The armature is supported by the yoke which is adjusted properly on the frame. It will be noticed there is slight clearance between the clapper and the right gong. This clearance is necessary at both ends of the clapper travel. The gongs are adjusted properly when the armature is operated manually and a small amount of light can be seen between the gong and clapper ball. With this clearance the gongs give a clear ring, whereas, if the clapper were made to stay in contact with the gong, the ring would be deadened considerably.

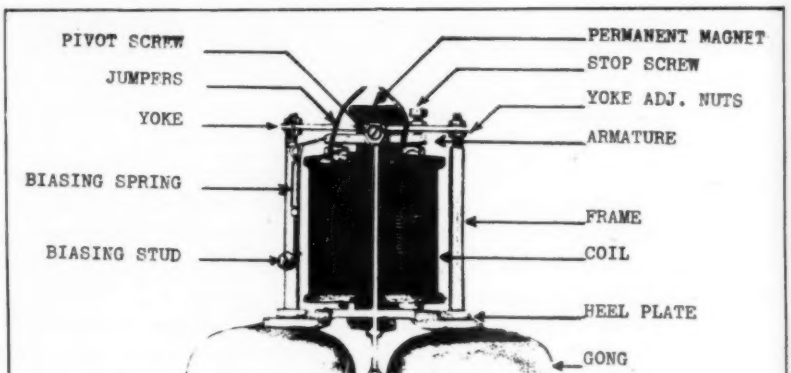


FIG. 6

STANDARDIZE WITH

Telex

PAINTS • VARNISHES • LACQUERS • ENAMELS

(TRADE MARK REGISTERED)

ESPECIALLY PREPARED FOR RESURFACING ALL TELEPHONE EQUIPMENT AND BUILDINGS

The new paint *standardization* program which we have formulated for several large telephone operating companies is now functioning with excellent results. Our Decorating Department submitted to these operating companies, at their request, color lay-outs from which they selected the combinations of colors they desired for the interior and exterior of all of their buildings. A specific code number was assigned to each of the paints included in these color lay-outs, and the operating companies are now ordering their paint materials from their telephone jobbers by the code numbers assigned thereto.

These companies are deriving many advantages from this paint *standardization*. It provides for color harmony in all exchanges; it permits economical volume purchasing; it insures uniform color and high quality paint at all times; it facilitates any necessary retouching by eliminating the difficulty of finding matching paints.

This arrangement is not confined to large operating companies, but is designed for use by companies of *all* sizes. Write us for a suggested *standardization* program for your company.

TELEX paints, varnishes, lacquers and enamels include every type of finish needed for all exterior and interior re-surfacing projects in the telephone exchange and for telephone equipment.

Telex SEMI-GLOSS ENAMEL

Telex FLOOR and DADO ENAMEL

Telex EXTERIOR EXCHANGE PAINT

Telex SHEEN FLAT WALL FINISH

Telex FUME PROOF ENAMEL

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● The automatic guard adds immeasurably to the safety of this pole—the point is covered when not in use—completely guarded against damage. When in use, the tubular sleeve slides back and reenforces the head, adding to the service life of the pole.
The spike is forged from best quality steel, heat treated and tempered for long life. Handles are select fir—sanded and lacquered—lengths regularly furnished ten to twenty feet. For maximum service life, economy, and value, specify
STURD E TOOLS
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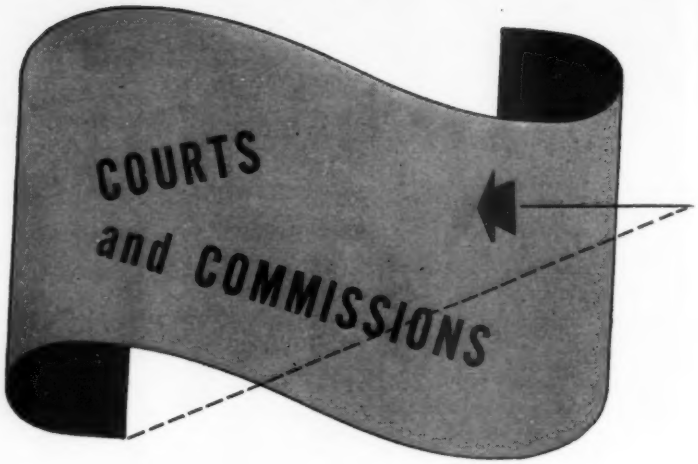

FCC Grants Application for Radio-Telephone Station

The Federal Communications Commission March 27 granted the application of Warner & Tamble Radio Service for authority to construct a coastal harbor radio-telephone station at Pittsburgh, Pa., denying the application of Radiomarine Corp. of America for similar authority.

The grant to Warner & Tamble was conditioned upon their obtaining War Production Board approval, within 90 days, for the acquisition and use of such equipment and materials necessary for construction of the station, and their filing with the commission verified statement of approval.

V V

Court Holds Michigan Bell Rebate Order Invalid

Circuit Judge Leland W. Carr May 18 held invalid an order of the Michigan Public Service Commission instructing the Michigan Bell Telephone Co., Detroit, to rebate $3,500,000 to its 1944 customers. (TELEPHONY, May 19, page 28.) The decision was expected to be appealed to the Michigan Supreme Court and, meanwhile, to affect some $10,000,000 in other rebates ordered against other utilities.

The commission had ordered the rebates on the grounds that $3,000,000 of this amount represented an illegal reserve for federal excess profits tax, that the company has increased its depreciation fund illegally by $25,000 and that it had listed its contract with the American Telephone & Telegraph Co. at $250,000 more than it should have.

Judge Carr pointed out that the commission had based its order on a section in the 1939 state law which eliminated the former public utilities commission and created the public service commission, giving the latter broader powers. He held that if the legislature intended to grant such wide powers, it was an unauthorized grant of legislative authority.

V V

Grants Rate Increase to Mason City, Ill., Independent

The Mason City (Ill.) Telephone & Telegraph Co. was granted authority by the Illinois Commerce Commission to increase its rates for telephone service, effective May 1, 1945, as follows:

	Net Annual Rates	
Class of Service	*Present*	*Proposed*
Individual line, business	$27.00	$30.00
Two-party line, business	21.00	24.00
Individual line, residence	21.00	24.00
Two-party	15.00	18.00
Extension telephone	6.00	6.00
Extension bells	—	1.80
Service stations	4.20	5.00

V V

Resume Negotiations to Buy Puerto Rico Company

(Special to TELEPHONY)—Negotiations leading to the final purchase of the properties of the Puerto Rico Telephone Co. by the government, will be resumed shortly, it was stated recently. (TELEPHONY, April 21, page 35.)

Jose Munoz, comptroller of the Puerto Rico Communications Authority, recently completed a survey of the telephone company's new dial system installations, at an estimated cost of $2,000,000 for the dial system only. The entire cost of the company's properties is being increased now to $6,000,000.

V V

Establishes Rate on Rural Four-Party Service

The Nebraska State Railway Commission recently approved application of the Lincoln (Neb.) Telephone & Telegraph Co. for authority to establish a rate of $4.50 a month for rural, four-

WHY WE MEASURE OUR OWN "YARDSTICKS"

Complex, sensitive instruments are a commonplace not only in the engineering laboratories but on the production lines of Connecticut Telephone & Electric Division. These instruments enable us to maintain the extreme precision in telephone equipment and electronic devices called for by Signal Corps standards. So important is this high precision that we have special apparatus for measuring the accuracy of the test instruments themselves.

The result of this constant testing and retesting is *better products*... better telephones, headsets, switchboards and other devices, for our armed forces, a better, brighter future for your communicating systems, electrical and electronic equipment for tomorrow.

MEASUREMENT BY TIME SIGNALS... *Using U. S. Government radio time signals of infinite accuracy as a basis, this apparatus permits our engineers to "test our own test instruments" for the ultimate in engineering and production-line accuracy.*

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GREAT AMERICAN INDUSTRIES, INC. • MERIDEN, CONNECTICUT

TELEPHONIC SYSTEMS • SIGNALLING EQUIPMENT • ELECTRICAL EQUIPMENT • HOSPITAL AND SCHOOL COMMUNICATIONS AND SIGNALLING SYSTEMS • IGNITION SYSTEMS

EVERY DAY IS "S" DAY*

BUCKINGHAM EQUIPMENT MAKES EVERY DAY A "SAFE DAY"

Safety depends as much on equipment as on the man. No lineman is safe unless his equipment is safe.

For 40 years linemen have depended on BUCKINGHAM equipment for safety, efficiency and comfort.

You can't beat that combination.

* *Safety Day*

BUILT BY
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OF BINGHAMTON

W. H. BUCKINGHAM MANUFACTURING CO., BINGHAMTON 6, N. Y., U. S. A.

party, restricted service at its Waverly exchange.

The new service, replacing the former 10-party arrangement, had been requested by members of the Greenwood business district who are served from the Waverly exchange.

V V

Former Commission Chairman Reported Seriously Ill

Will M. Maupin, 82, former chairman of the Nebraska State Railway Commission, recently was reported seriously ill at his home in Clay Center, following a severe heart attack.

Mr. Maupin recently launched a newspaper, in which he declared his intention of filing for governor.

V V

Named Supervisor

GEORGE MAYHEW, assistant supervisor of public service of the Illinois Commerce Commission was made supervisor of public service, April 1, 1945, following the death of GORDON LEITCH.

V V

Grants Rate Increase

The Illinois Commerce Commission recently authorized the Crescent Telephone Co., Erie, to increase its rates.

V V

Summary of Commission Rulings and Hearings

Federal Communications Commission

May 14: Granted extension of special temporary authority to American Telephone & Telegraph Co., Long Lines Department, Lawrenceville, N. J., and Ocean Gate, N. J., to operate point-to-point radio-telephone stations in the fixed public service, using regularly licensed equipment, frequencies, power and emission to communicate with Italcable, Rome, Italy, subject to condition that operation of this circuit will not cause interference with operational radio circuits of the United States armed forces. Authority to continue from May 16 until further order of the commission, but not beyond December 1, 1945.

Illinois Commerce Commission

May 22: Hearing on application of Mt. Pulaski (Ill.) Telephone & Electric Co. regarding proposed advance in rates for telephone service.

Kansas State Corporation Commission

May 8: Granted authority to Farmers Telephone Association of Flush, Kan., to make certain rate changes.

May 14: Granted permission to C & M Telephone Co. to transfer franchise and cease operating at Lansing and Monticello and territory adjacent thereto, and issued certificate of convenience and authority to transact telephone business in Madison and territory adjacent thereto.

May 14: Granted permission to Southwestern Bell Telephone Co. to

Why postpone getting the advantages of C.P.R.?

● As more regulatory bodies *require* this accurate system of plant valuation, more leading telephone companies are putting it into effect.

● Among the many benefits of this system—sound original cost study, plus Continuing Property Record—is sure control of construction expenditures.

● Get the advantages of this system *now*, as we have soundly applied it to Class A and B companies; write for details . . .

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Consulting Engineers
612 North Michigan Avenue, Chicago 11, Ill.
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DRIERITE

The Modern DESICCANT FOR DRYING CABLE SPLICES

DRIERITE dries the Cable Splice by positive absorption of all moisture from wires, insulation, bandage and surfaces inside the sleeve. Application is easy and rapid.

The snow-white granular **DESICCANT** is neither poisonous, corrosive nor abrasive, and does not evolve gas, fume or odor either in storage or in use. It eliminates all chance of fire, accident or discomfort to workmen or occupants of buildings.

STANDARD PACKAGES

1/8 Pint Can (50 grams) 48 per Carton.
1/2 Pint Can (200 grams) 12 per Carton.
1 Quart Can (800 grams) 12 per Carton.

For sale by the Manufacturer and leading telephone supply houses.

W. A. HAMMOND DRIERITE COMPANY
XENIA, OHIO

They happen under storm loads, true, but usually at points that have been previously weakened by abrasion, vibration fatigue or corrosion.

HUNDREDS of line breaks can be avoided, even during heavy weather, by using Amertel Telephone Wires and protecting them by improved tieing methods that dampen vibration and prevent abrasion.

Proved in millions of mile years in all parts of the world, the built-in qualities of Amertel Telephone Wires insure greater efficiency, less maintenance—hence, greater economy.

Continuous metallurgical and engineering control of the metal, advanced manufacturing methods and equipment, special coating techniques, years of experience and special training, enable our craftsmen to turn out quality wire—in quantity.

The service life of Amertel Telephone Wires can be further extended by improved tieing methods that enable the conductor to withstand extra millions of oscillations, prevent damage from chafing, tie burns and corrosion at those points.

Then too, when you need guy lines, messenger cable, or overhead ground or static wire for lightning protection, there is a type of U·S·S *Amerstrand* Steel Strand that has been *engineered* to more than meet your needs.

Plan now to prevent line failures and insure continuous operation of outside plants at less cost. Get complete information by sending for our technical literature on U·S·S Amertel Telephone Wires. This service is free. You incur no obligation.

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American Steel & Wire Company
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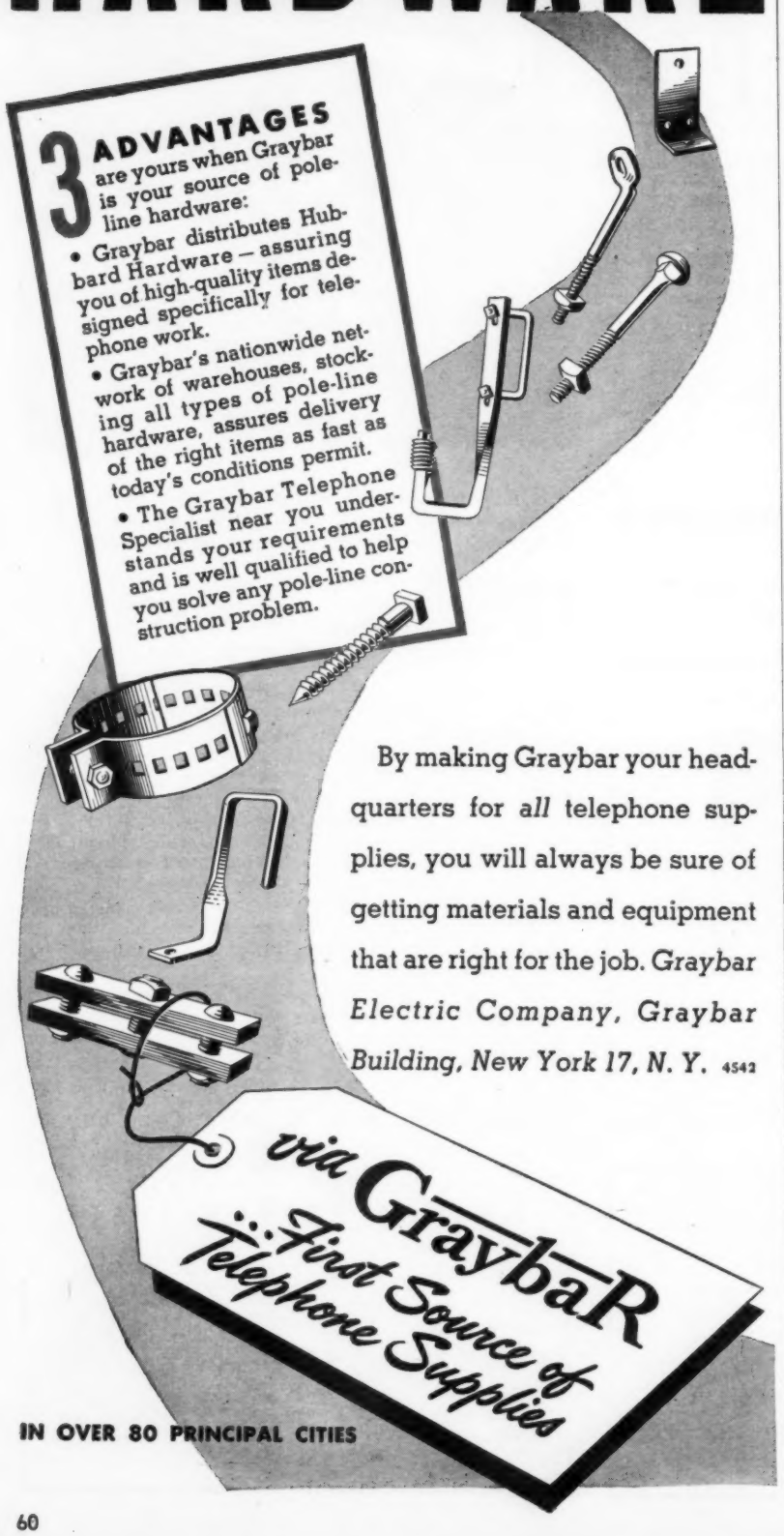
UNITED STATES STEEL

LOOK FOR THESE TAGS

They are your assurance of highest quality.

HARDWARE


3 ADVANTAGES are yours when Graybar is your source of pole-line hardware:
• Graybar distributes Hubbard Hardware — assuring you of high-quality items designed specifically for telephone work.
• Graybar's nationwide network of warehouses, stocking all types of pole-line hardware, assures delivery of the right items as fast as today's conditions permit.
• The Graybar Telephone Specialist near you understands your requirements and is well qualified to help you solve any pole-line construction problem.
By making Graybar your headquarters for *all* telephone supplies, you will always be sure of getting materials and equipment that are right for the job. *Graybar Electric Company, Graybar Building, New York 17, N. Y.* 4542
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transfer franchise and cease operating insofar as it furnishes telephone exchange service at Madison and territory adjacent thereto, and issued certificate of convenience and authority to transact telephone business in and adjacent to Lansing and Monticello.

May 15: Heard and advised Winsted Telephone Co. on its application for authority to make certain rate changes at Rolla.

May 29: Hearing on application of Green (Kan.) Telephone Co. for authority to make certain rate changes.

June 11: Hearing on application of Peoples Telephone Co., Lebanon, for authority to make certain rate changes.

Oklahoma Corporation Commission

May 23: Hearing on application of Sparks (Okla.) Telephone Co. for authority to discontinue service.

V V

Army Officer Pays Tribute To Signal Corps Men

Keeping Army telephone communications in step with advancing Allied armies in India, Egypt, Africa, Italy and Germany has been the task of Maj. Frederick J. Walsh of the Signal Corps, attached to the Army Air Force, formerly foreman of the New England Telephone & Telegraph Co. at Lynn, Mass.

Major Walsh, back in the United States on a confidential mission after more than two years in the service which began when he was commissioned a second lieutenant in 1942, paid tribute to the members of the Signal Corps who, under fire, daily extend the lines of wire communication.

V V

Independent Takes Over System

The Carter Hill (Pa.) Telephone Co., one of the first farmer-owned telephone systems to be constructed in Erie County and which had operated for 39 years, on May 3 relinquished its territory to the Wattsburg (Pa.) Telephone Co., connections having been completed earlier in the week with lines operated out of the Wattsburg exchange. (TELEPHONY, May 19, page 30.)

V V

Watch Ground Connection

Perhaps one of the most common causes of rural line trouble is a defective connection between ground wire and rod. Often, an attempt is made to solder a wire to a rusty ground rod which seldom is successful. One approved method is to purchase ground rods with a length of wire attached and then connect it to the ground wire with a compression type sleeve. This makes a good electrical and mechanical connection without the difficulty of soldering.

Install Sub-Cycle— Eliminate Trouble and Expense

SUB-CYCLE

. . . The "Static-Type Ringing Converter" has gained in popularity wherever the conversion of commercial AC supply to a powerful dependable ringing current is needed.

ALSO PULSATORS

Sold by Leading Distributors

Many times Sub-cycle, under the severest operating conditions, has proven its inherent value—Thoroughly field-tested — Entirely fool-proof — Built to stand "Heavy-Duty" use and designed in accordance with sound engineering principles, Sub-Cycle meets the most exacting requirements of operating companies for Ringing Service—It will deliver long reliable service.

MADE IN 6 MODELS

To carry loads Ranging from Small PBX to Large Central Office Systems.

LORAIN PRODUCTS CORPORATION • Lorain, Ohio

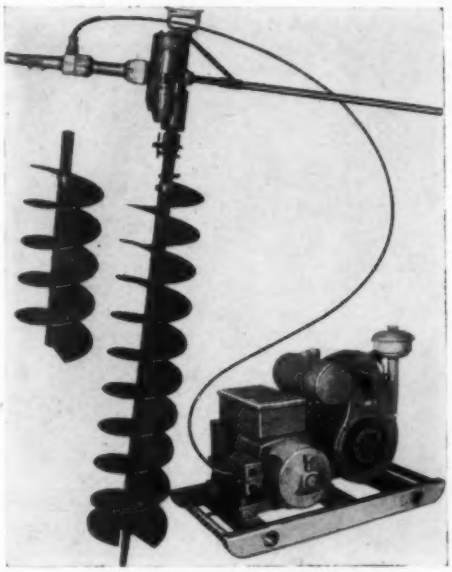
Cut Construction Costs...
Save Time and Labor
with the

KA-MO EARTH BORING DRILL

You can increase speed and efficiency—you can save time and expense—when you drill anchor and pole holes the Ka-Mo way. It's easier too, because the Ka-Mo Portable Drill is light, sturdy and easy to use. Cuts digging time 75%:

The Ka-Mo heavy-duty electric motor puts down 8 to 12 inch diameter holes in surprisingly short time . . . in mud, sand or clay without grabbing. Drills holes at any angle . . . simplifies work in ordinary hard-to-reach places, and is ideal for installing ground rods and screw anchors.

Power is supplied by a 2½ KW AC Generator (shown in illustration) or a 3 KW DC Generator. Sturdily built to withstand outdoor abuse, generators are compact and easily carried. Complete unit can be carried in truck. Write to your nearest dealer today for complete details and prices.



GENERATOR SPECIFICATIONS

2½ KW AC Generator—115 volt, 60 cycle single phase—36" long, 19" wide, 25" high Wt.—319 lbs. Used as a standby source of power for exchange emergencies, outside night work, etc.

3 KW DC Generator—110 volt—36" long, 19" wide, 28" high Wt.—240 lbs. Lighter than AC generator and delivers more power per pound of weight than AC.

KA-MO TOOLS INC.

5525 West Ohio St. Chicago 44, Illinois

KLEIN
QUALITY

Safety engineers, purchasing agents and others interested in linemen's equipment can obtain a folder on "Klein-Kord" on request. Write for your copy today.

In the electrical industry—noted for its exacting demands for quality—it is significant that Klein pliers and equipment have remained the standard for more than three-quarters of a century.

And today—as when the first wires were strung—the name Klein still stands first with linemen and electricians who demand reliability plus a high factor of safety in the tools and equipment on which their very lives depend.

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

KLEIN TOOLS EST. 1857

Since 1857

Frank H. Woods of Lincoln Honored by University

Frank H. Woods, president of the Lincoln (Neb.) Telephone & Telegraph Co. who, as a "great enterpriser," was awarded the degree of doctor of law on May 21 by the University of Nebraska, of which he is an alumnus, is the first person outside of the legal profession to be so honored by the university. Mr. Woods began his law practice in Lincoln but in 1903 joined in forming an Independent telephone company to compete with the local exchange of the Nebraska Telephone Co., now a part of the Northwestern Bell Telephone Co.

In 1912 the company, which had been buying other Independent companies, took over, by purchase, all of the Bell properties in 22 counties south of the Platte River. The Lincoln exchange was one of the first in the country to use dial equipment, it was reported. As president of the national association of Independent companies in 1910, Mr. Woods headed a committee that, after seven months' negotiations, secured an agreement from the Bell interests that resulted eventually in a nationwide unification of service and an end to competition. These negotiations were made possible only after Mr. Woods, on behalf of the association, started numerous anti-trust suits against the Bell.

Mr. Woods is chairman of the board of directors of the Addressograph-Multigraph Co., Cleveland, Ohio.

V V

Name Independent Manager

MRS. GRACE DINKLE recently succeeded MRS. WALLACE COLLINS as operator and manager at the Eskridge, Kan., office of the American Telephone Co., Abilene, Kan. MR. COLLINS will continue as local lineman at Alma, Kan.

V V

OBITUARY

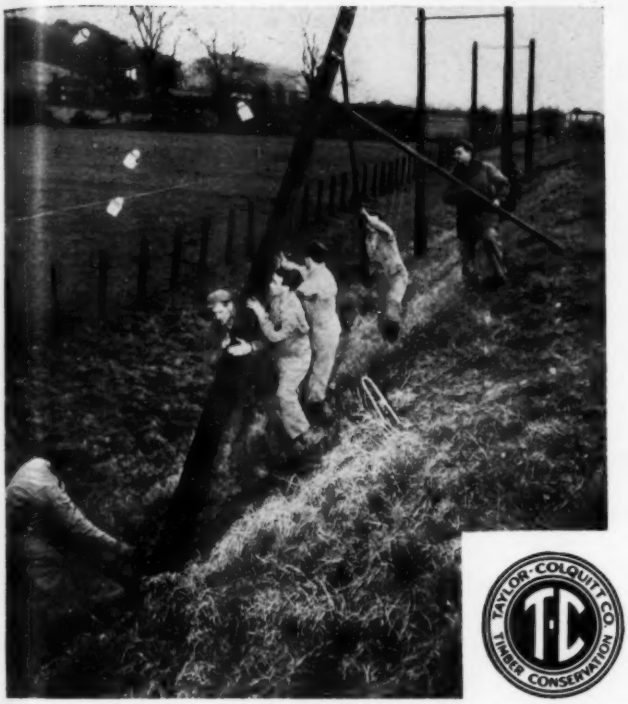
FRANK E. COWAN, 72, former manager of the Lancaster office of the Bell Telephone Company of Pennsylvania for 20 years, died at his home May 5. He had been in ill health for more than two years.

Mr. Cowan was associated with the Bell company for 40 years, having served as manager at the Lebanon, Chambersburg, Pottsville, Easton and Lancaster branches. He retired from business nine years ago, after having directed the change from manual to dial service in Lancaster.

He was a member of the Telephone Pioneers of America and of the Rotary Club.

He is survived by his widow and two nieces.

"ALL Americans"



THE SCENE IS "SOMEWHERE IN ENGLAND." But the men are Americans—members of the U. S. Army Signal Corps. And the pole is American—grown and pressure-creosoted in the United States. Only the United States can supply poles of the finest quality, and in the enormous quantities required for military construction.

For many months, these military needs have had first call on Taylor-Colquitt production. But we look forward to the day when we shall again be able to make prompt shipments to meet *your* requirements.

Products distributed to Independent Telephone Companies by AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, Illinois.

TAYLOR-COLQUITT CO.
SPARTANBURG, S. C.
PLANTS AT
SPARTANBURG, S. C. AND WILMINGTON, N. C.

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LOOK FOR LENZ THIS MARK OF QUALITY

LENZ ENGINEERING

Has produced Cords, Wire and Cable that have withstood today's severest service, and will be responsible for tomorrow's still better products.

For instance: LENZ Operator's Cords give longer service today because of their increased durability—Sturdier tinsel conductors—Improved insulation with outer braids of stronger threads—Finer moisture-proof construction.

For better service plus maximum economy—Specify LENZ. Write today for complete information.

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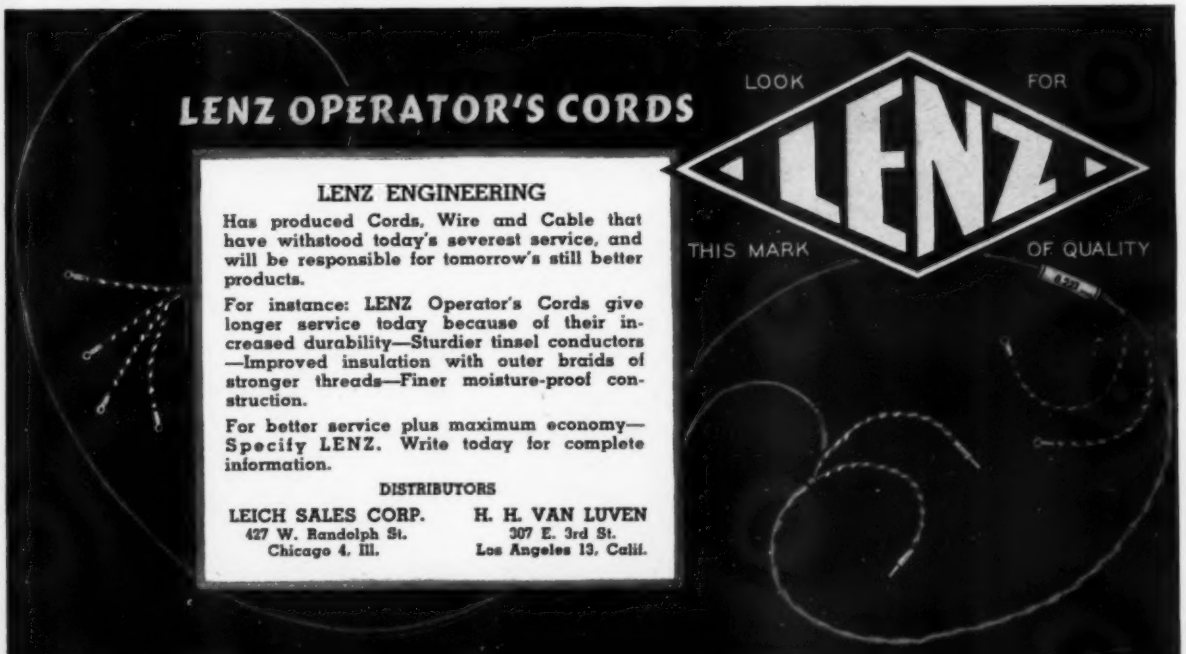


LENZ ELECTRIC MANUFACTURING CO.

1751 N. WESTERN AVE., CHICAGO 47, ILL., U. S. A.

"IN BUSINESS SINCE 1904"

Count 'em!

PLASTITE* Insulation Permits Over 3 Times As Many Wires In A Half Inch Duct

Illustrations One-half Actual Size

Approved practice allows 7 pairs of old style rubber and cotton insulated wires in a half inch duct. (See above.)

The same approved practice allows 23 pairs of new style PLASTITE* insulated wires in a half inch duct.

Saving Duct Space Saves Money

In addition **PLASTITE*** is a lower cost wire
is practically ageless
is easy to instal
gives trouble free installations
has bright colors in 2, 3 and 4 conductors

Ask Graybar for Prices, Samples, Bulletins.

Order by Whitney Blake Catalogue No. 22S2, 22S3, 22S4

* Reg. U. S. Pat. Office

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

Porter and Hill Move Up In North Carolina Company

Luther W. Hill on May 11 was elected president of the Carolina Telephone & Telegraph Co., Tarboro, N. C., succeeding John R. Porter who was named chairman of the board of directors.

J. R. PORTER

Mr. Porter, company president since 1938, in his capacity of board chairman succeeds George A. Holderness, retired.

A native of Darlington, S. C., Mr. Hill had been operating vice president of the company since August, 1943,

L. W. HILL

joining the firm after having been connected with the Southern Bell Telephone Co's. offices in Atlanta, Ga. A graduate of the University of Southern Carolina, he has been in the telephone business for a period of 22 years, broken only by the two years in which he served with the Army Signal Corps in World War I.

Authorize Telephone System Improvements at San Juan, P.R.

(Special to TELEPHONY) — Simultaneous with the installation of the Puerto Rico dial telephone system, improvements will be made in the communication system at San Juan, Santurce and Rio Piedras, comprising the metropolitan area of San Juan, following a public service commission order authorizing the Puerto Rico company to adapt and put into service at the central station of Rio Piedras a "two number" method for all calls originating from station-to-station in Rio Piedras, San Juan and Santurce. (TELEPHONY, April 21, page 35.)

The company also was authorized by this order to discontinue the ticket system of recording station-to-station calls originating at the Rio Piedras station for San Juan and Santurce, and to substitute a two number toll ticket, according to a sample submitted by the company to the commission.

The commission denied a petition filed by the Puerto Rico Telephone Co. to discontinue the present person-to-person system of calls and calls by messenger, since these services will continue to be given by the company to its subscribers in regular form and according to present rates.

The commission also denied a petition requesting authorization to introduce time intervals of three minutes when circumstances so demand, for station-to-station service through the Rio Piedras station to the central stations of San Juan and Santurce through the "two number" method, stating that no change made from the present five-minute period would be authorized by the commission unless the company followed the regular procedure for modifications as set down by the rules and regulations of the commission.

V V

Guy Corners Properly

Perhaps one of the most serious faults in the construction of rural lines is improperly guyed corners. If corners are not well-guyed and anchored, the line wire cannot be maintained at correct tension. When wire is not tensioned properly, most certainly it will cause trouble. Corners should be constructed correctly and then well-guyed and anchored.

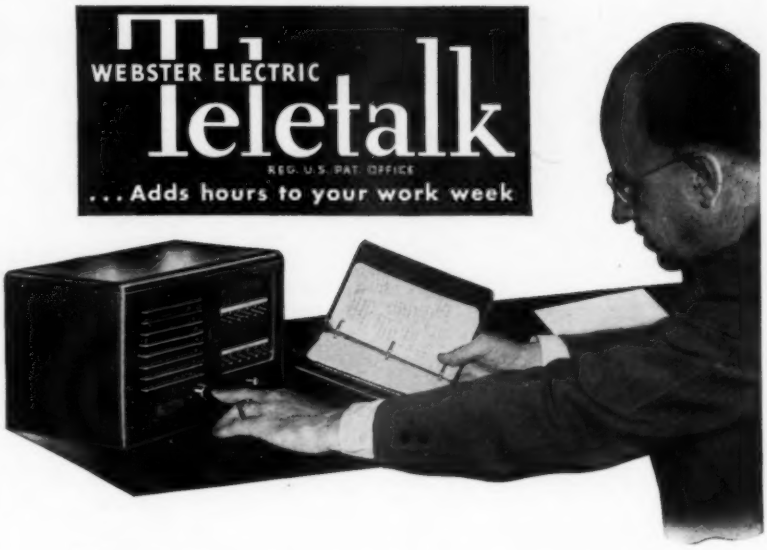
V V

Good Guying Essential

Good guying is most essential if a rural line is to give good service and be trouble free. When guy strand and guy clamps are not available, a good job of guying can be done with large (No. 9 or larger), high-tensile strength wire and compression type sleeves.

Many are Called... *Quicker*...with

WEBSTER ELECTRIC
Teletalk
REG. U.S. PAT. OFFICE
...Adds hours to your work week



Every delay in calling individuals to the phone is apt to shut out one or more revenue-producing calls.

That is why telephone companies everywhere are encouraging the use of Teletalk Intercommunication Systems to extend their service in the places of business of their subscribers.

With Teletalk, waiting time is cut down when orders need to be checked, information is required on accounts, on deliveries . . . any of the hundred and one details that arise in the operation of every business, both large and small.

Show your subscribers the advantages of Teletalk . . . its time and energy-saving convenience . . . its quick, easy installation . . . its long life and dependability.

By so doing you will greatly increase the value of their telephone service in these war-busy days when manpower is scarce and time is more precious than ever before.

Write to us for full information on Teletalk. Do it today.

Licensed under U. S. Patents of Western Electric Company, Incorporated, and American Telephone and Telegraph Company

Let's All Back the Attack—Buy Extra War Bonds

WEBSTER ELECTRIC

Racine, Wisconsin, U.S.A. • Established 1909 • Export Dept.: 13 E. 40th Street, New York (16), N. Y. Cable Address "ARLAB" New York City

"Where Quality is a Responsibility and Fair Dealing an Obligation"

METAL CHAIRS

Sturdy, Comfortable...

Just Released

The sturdy, comfortable Sturgis Metal Operator's Chair is now ready for immediate delivery.

This durable metal chair has a base of 1″ diameter steel tubing. The circular footrest is constructed of ¾″ steel tubing. All joints are smoothly welded.

Seat is a hair pad covered with genuine brown leather; 16½″ wide, 14½″ deep. Back is plaited, curved genuine brown leather, hair-filled; 8″ high, 13″ wide.

STURGIS METAL CHAIRS

CHAIR HEIGHT SPECIFICATIONS

Seat Height Adjustment	Footrest Height from Floor
18″-22″	5″
20″-24″	6″
22″-26″	8″
24″-28″	10″
26″-30″	12″
28″-32″	13″

Order your Sturgis Chairs today! Reduce maintenance costs.

EXCLUSIVE with STROMBERG-CARLSON

STROMBERG-CARLSON

Factory, General Offices: Rochester 3, N. Y.

Branch Offices: Chicago 6, Kansas City 8, San Francisco 3

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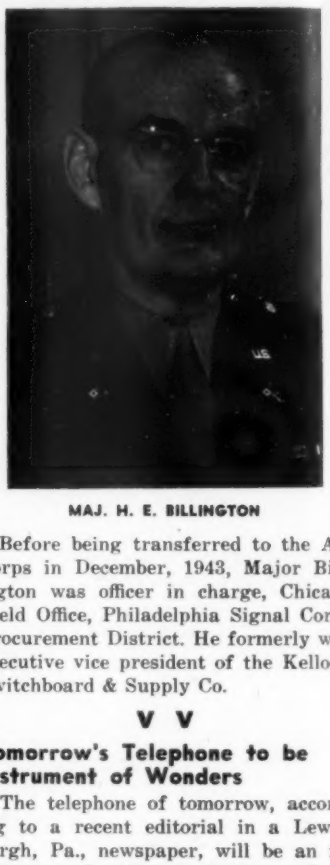
Major Billington to Leave Army in June

Maj. H. E. Billington, who has been chief of the radio branch, Procurement Division, Air Technical Service Command at Wright Field, Ohio, has returned to Chicago on leave prior to going on inactive status in June.



MAJ. H. E. BILLINGTON

Before being transferred to the Air Corps in December, 1943, Major Billington was officer in charge, Chicago Field Office, Philadelphia Signal Corps Procurement District. He formerly was executive vice president of the Kellogg Switchboard & Supply Co.

V V

Tomorrow's Telephone to be Instrument of Wonders

The telephone of tomorrow, according to a recent editorial in a Lewisburgh, Pa., newspaper, will be an instrument of many wonders, one of the most dramatic being a telephone that answers itself when you are away from home or office, records the message and repeats it on your return.

Listed also are telephone service in moving vehicles through a radio exchange, a pocket radio pickup which will tell you when your home or office telephone is ringing, and a variation on the military walkie-talkie which, carried by farmers, engineers or others who must work far afield, keeps them in contact with home or headquarters.

The editorial asks the reader to consider such conveniences as completely automatic service, volume controlled telephones for the hard of hearing and automatically ventilated telephone booths, with perhaps the possibility of television attachments.

These wonders, the editorial cautions, are not available at the moment and will be provided only as fast as the public is willing to pay for them, and, we may add, as the WPB allows them.

Tribute to Operators

(Concluded from page 51)

this morning? One of the cows is sick and I think he better try to get hold of the veterinary and bring him out." The operator says, "Sure, Mrs. Johnson, I saw Jim go by a few minutes ago. He probably is at Ducketts Store. Hold on a minute and I'll see if I can locate him for you."

And when there's a fire, heavenly days! What a busy switchboard. The operator calls all the volunteer firemen and anyone else who may be able to lend a helping hand. The bucket brigade goes to work and many a home is saved through their efforts and the faithful service of the operator at the switchboard.

The operator in a small town or rural community is, you might say, in a class by herself. We know that many of the services she renders would be impractical in a larger community, but for the people living in the small town, the operator's service is pleasing, satisfactory and indispensable.

In years to come, many small town operators, like Elmira in the story *Party Line*, will retire to make way for modern mechanized equipment, and like the people in the small California town, they, too, will long be remembered for their kindly spirit of service, for the many favors and accommodations received at their hands during long years of loyal, faithful service at the central office switchboard.

V V

Plan Metallic Circuits; Oppose State Tax

Stockholders of the Rockingham (Va.) Mutual Telephone & Telegraph Co. at their 48th annual meeting held recently, renewed their operation contract with the Harrisonburg (Va.) Telephone Co. for five years, and discussed plans for extension of metallic circuits.

The mutual went on record as opposed to a proposal that Virginia assess a state tax on telephone systems and calls, pointing out that the federal tax already is sufficiently heavy.

V V

Elect Kepler Club Director

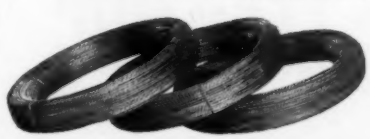
R. E. KEPLER, general superintendent of the Durham (N. C.) Telephone Co., on May 10 was elected senior director of the Durham Engineers' Club.

"What? Only 16 poles to the mile?"
Crapo HIGH TENSILE TELEPHONE LINE WIRE
COMPARE THE SPAN LENGTHS!
SIZE NO. 12 B.W.G. HEAVY LOADING DISTRICT
Crapo HTL-135
SPANS TO 350 FEET
Crapo HTL-85
SPANS TO 225 FEET
B.B. GRADE
SPANS TO 150 FEET
INDIANA STEEL & WIRE CO. MUNCIE INDIANA

Crapo High-Tensile Line Wire Cuts Cost of Rural Lines

Spans to 350 feet are possible in Heavy Loading Districts where Crapo HTL-135 Telephone Line Wire is used. This means that, in straight runs over flat open terrain, the number of poles per mile can be reduced to 16.

Substantial economies both in construction and maintenance are the result. Initial building costs are lower because of marked savings in material and labor; upkeep expense is minimized because there are fewer pole structures to maintain. These savings will be an important consideration in the expansion of rural telephone service which lies ahead.



Crapo HTL-135 Line Wire possesses two and one-half times the tensile strength of standard B. B. wire; provides for extra long-span construction. Crapo HTL-85, with 60% greater strength than B. B., makes possible spans well beyond the range of the latter grade. Both Crapo HTL-135 and Crapo HTL-85 have superior telephonic transmission qualities.

Write for Complete Information!

Take full advantage of these high-tensile line wires in your post-war building program! Contact the nearest distributor of Crapo Galvanized Telephone Wire and Strand or write direct for Technical Bulletins No. 201 and No. 202!

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

1500 HOURS AVERAGE LABORATORY LIFE

Sylvania Tungsten Telephone Switchboard Lamps

Faster . . . even *brighter* signals . . . are not, in themselves, sufficient recommendation for switchboard lamps these days. Such lamps, in *addition*, must be uncommonly strong. Sylvania Tungsten Telephone Switchboard Lamps have an average laboratory life of 1500 hours. One reason: a filament that is extremely resistant to breakage. And that's one reason switchboard operators prefer Sylvania Lamps—they're *stronger*.

Naturally, they're faster, too (tungsten lights up more quickly than any other type of filament) . . . and brighter (light is whiter, yet never too intense).

SPECIFICATIONS

SYMBOLS	VOLTS	AMPERES MIN.	AMPERES MAX.	APPROX. COLD RESISTANCE OHMS	RATED AVERAGE B. P. C.
4A–2	4	.170	.210	2	135
4B–2	4	.270	.310	1.3	200
6A–2	6	.120	.160	4.5	225
6B–2	6	.270	.310	2	250
8A–2	8	.080	.100	9	250
8B–2	8	.100	.120	7	320
10A–2	10	.100	.120	9	190
10B–2	10	.240	.260	4.5	560
12A–2	12	.090	.110	12	295
15A–2	15	.090	.110	15	275
16A–2	16	.090	.110	16	340
16B–2	16	.270	.310	5	610
18A–2	18	.035	.050	46	165
18B–2	18	.090	.110	18	350
20A–2	20	.060	.085	27	365
20B–2	20	.090	.110	20	355
24B–2	24	.035	.050	61	140
24C–2	24	.060	.085	33	535
24D–2	24	.090	.110	24	610
30A–2	30	.060	.085	41	670
30B–2	30	.090	.110	30	490
35A–2	35	.035	.050	89	300
35B–2	35	.060	.085	48	645
35C–2	35	.090	.110	35	445
40A–2	40	.060	.085	55	425
44A–2	44	.060	.085	61	630
48A–2	48	.060	.085	66	625
48B–2	48	.090	.110	48	600
48C–2	48	.032	.038	185	145
55B–2	55	.090	.110	55	440
55C–2	55	.045	.055	104	425
60A–2	60	.045	.055	113	525

Sylvania Tungsten Telephone Switchboard Lamps fit standard sockets and can be used in any type of switchboard. Accurate manufacturing and testing methods assure tight, correctly formed bases . . . close tolerances are maintained to prevent sticking in sockets.

AVAILABLE IN: CLEAR, NATURAL RUBY*
NATURAL GREEN*
**While present supply lasts.*

SYLVANIA ELECTRIC

SYLVANIA ELECTRIC PRODUCTS INC.
Salem, Massachusetts

MAKERS OF FLUORESCENT LAMPS, FIXTURES, ACCESSORIES;
INCANDESCENT LAMPS; RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES

Betterments in Rural Service

(Concluded from page 24)

ground connections now are possible in most locations. Also, testing methods may be utilized to make certain that a newly made ground connection will prove satisfactory in service.

If equipment and material now perfected, which undoubtedly will become available for civilian use soon after the war, are properly used on farm lines, these certainly will contribute much toward rendering better service at lower cost. In this connection, it is our opinion that telephone companies undoubtedly will take advantage of whatever methods are found practicable to provide good, reliable and economical service for rural areas.

Rural Line Testing

(Concluded from page 36)

nature never are accurate and can be considered only as approximate.

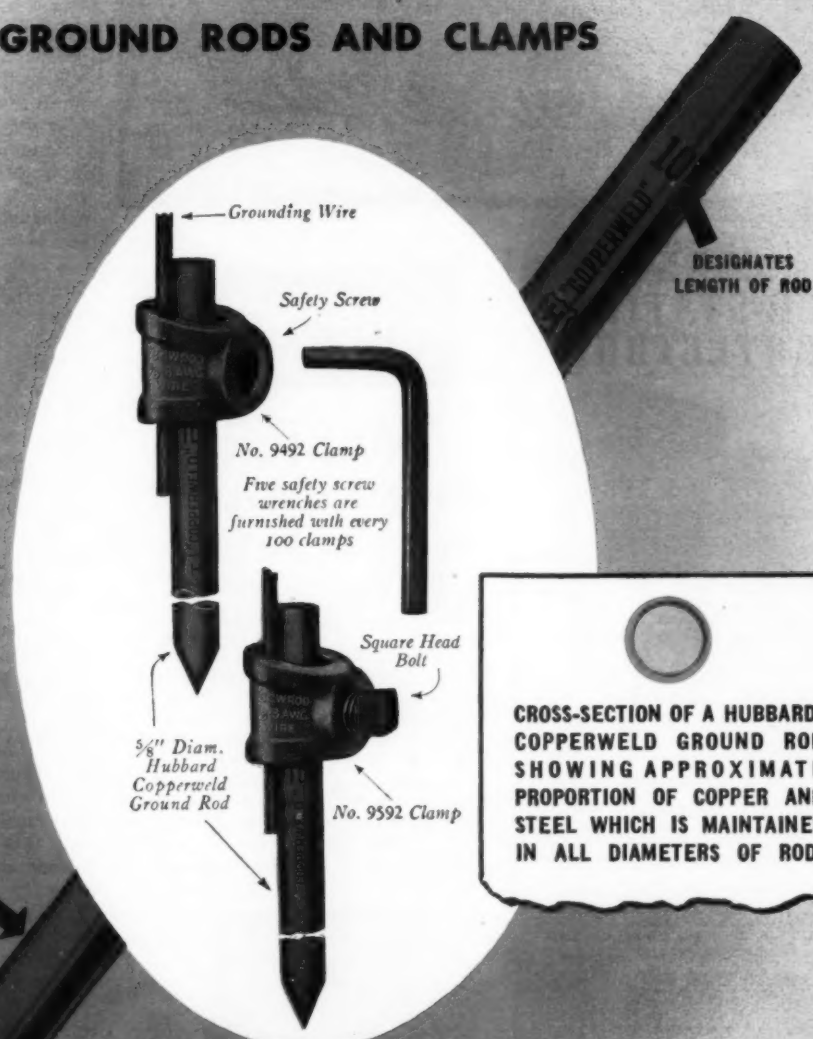
A head receiver with a small dry cell in series and test clips attached will prove most useful in the testing and location of telephone instrument trouble when more accurate instruments are not available. This device is especially suited for tracing circuits through the telephone wiring. It also will prove helpful in testing for open fuses and grounded protector blocks in the station protector.

It is not the intention of the author to limit the number or types of testing instruments which should be used in connection with rural line maintenance, but only to mention and describe a few which may be considered essential under normal conditions. We are of the opinion that good testing instruments, if used properly, will in all cases prove a worthwhile investment in any telephone exchange, regardless of size. These instruments reduce the element of guess and increase the know-how of the troubleman which is certain to contribute much to good rural telephone service.

Buy War Bonds

HUBBARD-COPPERWELD

GROUND RODS AND CLAMPS


Grounding Wire
Safety Screw
No. 9492 Clamp
Five safety screw wrenches are furnished with every 100 clamps
Square Head Bolt
5/8" Diam. Hubbard Copperweld Ground Rod
No. 9592 Clamp
DESIGNATES LENGTH OF ROD
NO. 9440 3/8" x 10 FT. HUBBARD-COPPERWELD ROD

CROSS-SECTION OF A HUBBARD-COPPERWELD GROUND ROD SHOWING APPROXIMATE PROPORTION OF COPPER AND STEEL WHICH IS MAINTAINED IN ALL DIAMETERS OF ROD.

RODS—DIAMETERS FROM 3/8" TO 1"—LENGTHS FROM 5 FT. TO 40 FT.

CLAMPS—TWO STYLES, SAFETY SET SCREW AND SQUARE HEAD BOLT—FOR ALL DIAMETERS OF RODS.

HUBBARD AND COMPANY

EXCLUSIVE NATIONAL SALES AGENT FOR COPPERWELD GROUND RODS AND CLAMPS

PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

STROMBERG-CARLSON *Recommends...*

COOK SUB-STATION PROTECTORS

Type RO Cook Sub-Station Protector

THE TYPE RO (illustrated), is for outside mounting and is equipped with a bracket and heavy zinc weather hood. The heavy steel bracket will appeal to telephone engineers and maintenance men who want equipment that can take quick, rough handling and subscriber abuse without danger of breakage. All structural parts and the heavy hood and bracket are grounded.

THE TYPE R Sub-Station Protector Mounting has a higher resistance to breakage from the shocks of severe electrical discharges. They are equipped with heavy studs for connecting drop wires and ground.

THE TYPE RI (without hood), is for inside mounting.

SUB-CYCLE

"MASTER" RINGING CONVERTER

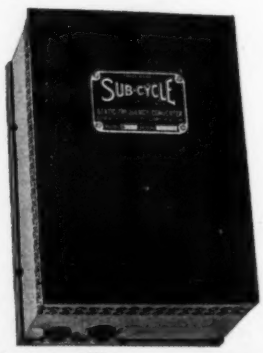
No Moving Parts . . .
Nothing to Adjust

Sub-Cycle brings to the telephone field an exclusive development in an *alternating current* Power Ringing Converter which fully meets the requirements of operating companies.

It produces a powerful ringing current entirely independent of frequency variations in the commercial power supply.

Economical and quiet in operation, it does not interfere with radio and requires no routine maintenance.

Available in 6 models suitable for loads required for small P.B.X.'s to large central offices.



Output capacities 7½ to 45 watts.

STROMBERG-CARLSON COMPANY

Factory and General Offices: Rochester 3, New York, U.S.A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Armchair Collegian Studies Via Two-Way Sound Set

Although not in regular attendance in the classroom, Frank Huettner, Jr., Eau Claire, Wis., is taking a pre-law course at the Eau Claire State Teachers' College by means of a two-way sound set, called a Teach-a-Phone, developed in Bell Telephone Laboratories, Inc., New York, which enables him to tune in for each of his classes, listen to the lectures and take part in class discussion.

Frank, who is 17 years old, was injured three years ago in a motor bus accident. In the office of his osteopathic physician, he read a magazine article which told how students in Iowa had been able to continue their studies through use of two-way sound sets. He wrote to the author of the article who, in turn, encouraged him to continue his education by similar means.

Frank was able to procure from Bell Laboratories in New York an experimental set consisting of three instruments, one of which was to be used in the home, and the other two in the classroom.

When it broke down, a new set was made, consisting of two instruments, one located at Frank's home, and the other at the college.

The instrument at the college is carried from room to room by students in Frank's classes. The set at the Huettner home has a directional microphone which picks up Frank's voice only as he speaks into it. The set at the college has a nondirectional microphone which picks up any sound in the room, making it possible for Frank to hear his fellow students and the teacher clearly from any part of the room.

V V

Bell Engineer Patents Voice Amplifier

A method of giving persons louder voices by inoculating them with extra sound vibrations, was found among the inventions listed as patented in the current issue of the *Official Gazette of the United States Patent Office.*

Norman R. French of Pleasantville, N. Y., engineer for Bell Telephone Laboratories, Inc., won patent number 2,374,090 on a device for use in public address systems. The apparatus is designed to meet conditions such as those encountered at large conventions or sports events, where an enormous volume of ambient noise surrounds both speaker and listener.

Under such conditions, a talker raises his voice to make himself heard. However, he experiences difficulty because the higher voice frequencies which contribute greatly to intelligibility and are

relatively weak often are too close to the noise level, even when the talker is shouting. The result is that even persons standing nearby have difficulty in hearing him.

The patented device is an arrangement for mechanically producing sound vibrations of certain frequencies and amplitude and introducing them into the vocal cavities of a speaker. There these vibrations mingle with the sound vibrations produced by natural speech and are molded by the throat, mouth and nasal passages into speech. The result is that the amplitude of speech vibrations is increased greatly and a speaker can relax and use his normal speaking voice without straining for volume.

The apparatus consists of a small electroacoustic transducer which is applied to the skin in the region of the throat of a speaker. This is hooked in sequence to a harmonic producer, a low-pass filter, an amplifier, another harmonic producer, a high-pass filter, a network for controlling the amplitudes of individual frequencies and an electroacoustic converter whose output is introduced into the vocal cavities of the speaker.

In operation, sound vibrations of normal speech are picked up by the skin contact and passed along so that only the proper fundamental currents and harmonics reach the converter and are returned.

The patent was assigned to the Bell Telephone Laboratories, Inc., of New York City.

V V

Keep Records of Rural Line Troubles

It is always a good idea to keep accurate records of the the location of all rural line trouble. These records may be analyzed from time to time in order to detect weak points in the line. In one case, frequent trouble due to broken insulators was traced to a rocky hill near a schoolhouse. The difficulty was explained to the teacher who cautioned her pupils against throwing rocks at insulators and the trouble ceased.

In another case, frequent trouble was caused by bailing wire in the lead near a farmer's barn. Investigation disclosed that the farmer's boys had a game of throwing bailing wire over the line and often they lost. Numerous repeat troubles of this nature may be detected and eliminated by an analysis of trouble records over any period of time.

BUY WAR BONDS

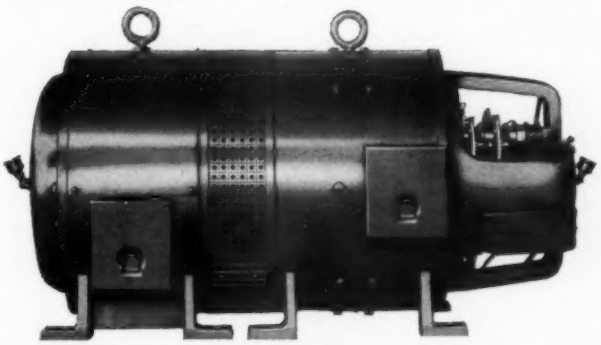
HOW ABOUT YOUR BATTERY CHARGING EQUIPMENT FOR TELEPHONE EXCHANGE BATTERIES? . . .

DO YOU WANT:—

• Completely Automatic Operation . . . Voltage controls well within high-low limits at all times . . . longer battery life . . . quick recharge of battery following prolonged power interruptions . . . minimum transmission of noises to the circuit . . . protection against damaging overloads . . . freedom from "running away" or reversal of polarity ?

Then Install . . .

THE DIVERTER POLE MOTOR GENERATOR



. . . because of its' inherent CHARACTERISTICS, provides fully for all these vitally essential features insuring peak efficiency, maximum life and minimum charging costs for TELEPHONE EXCHANGE BATTERIES.

Diverter-Pole Generators are an exclusive E.P. design. Available in all standard voltage and ampere capacities from 10 to 2000 amperes, they are specially designed for telephone charging service. X-2

The Electric Products Co.
1727 CLARKSTONE ROAD · CLEVELAND 12, OHIO

American

UTILITIES BODIES and EQUIPMENT
DESIGNED and ENGINEERED FOR
SERVICES and SATISFACTION

"AMERICAN" Telephone Rural Maintenance Body Model 4551 Length 70"

Model 4804 — American Body with Standardized General Utility Compartments.

Preferred Equipment By Communication Companies for Line Construction Maintenance and Installation

Some of the many reasons why "American" Bodies and Equipment meet most completely and economically the actual working conditions of the communication companies, proving real time and money savers, are: Correct Design . . . Superior Quality Construction . . . Strength . . . Endurance . . . Comfort . . . Convenience . . . Safety . . . Low Operating Costs, and Fine Appearance.

In most situations there's an "American" Standard Body that will meet all demands but at times conditions arise that call for special design and construction. In these cases American Engineers through wide experience are able to design bodies and equipment exactly fitted to your special requirements. The "American" line includes: Line Construction Bodies . . . Telephone Installation and Maintenance Bodies . . . Cable Splicers and Pole Trailers . . . Pole Derricks . . . Winches . . . Reels . . . Power Take-Offs and various other associated equipment.

BUY MORE WAR BONDS . . . and HOLD WHAT YOU HAVE

THE American COACH & BODY CO.
PUBLIC UTILITIES EQUIPMENT FOR MOTOR VEHICLES

Prominent Independent Made Colonel

J. E. Albert, vice president and general manager of Associated Public Utilities Corp., Columbus, Ohio, recently was promoted to colonel in the U.S. Army Air Corps.

COL. J. E. ALBERT

Colonel Albert is commanding officer of the Army air base at Lawson Field, Fort Benning, Ga. He has been stationed at Lawson Field since September, 1942.

V V

BOOK REVIEW

In response to the many requests for an advance printing on "Circuit Kinks" which is scheduled as Part C of Harry E. Hershey's book, *Automatic Telephone Practice*, fifth edition, this information has been compiled into a 24-page book which may be purchased through TELEPHONY for $1.00. (TELEPHONY, March 31, page 39.)

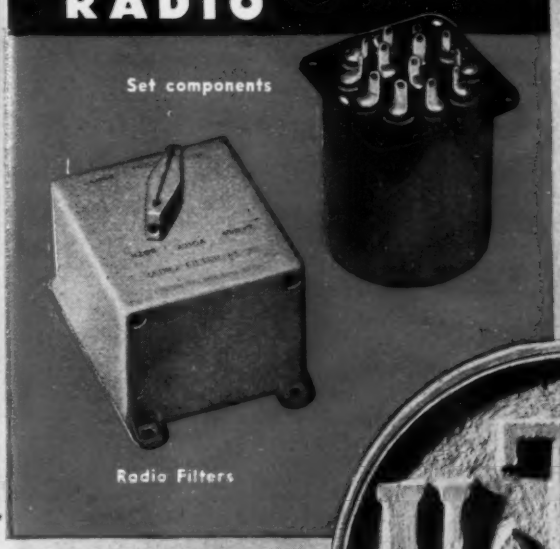
In "Circuit Kinks," Mr. Hershey recognizes the importance of a knowledge of the basic circuit elements without which the physical components such as relays, stepping switches, condensors, etc., could not operate.

The experienced designer of electrical control equipment uses these basic circuit elements almost by intuition, knowing instinctively what to do to achieve a certain result. Because he works mainly by intuition, the circuit kinks he uses have never (until now) been available to others in published form. By taking these basic elements away from their usual circuit context, Mr. Hershey has made a notable contribution to the literature on electrical control in a form and language readily understandable to the novice, as well as useful to more advanced technicians.

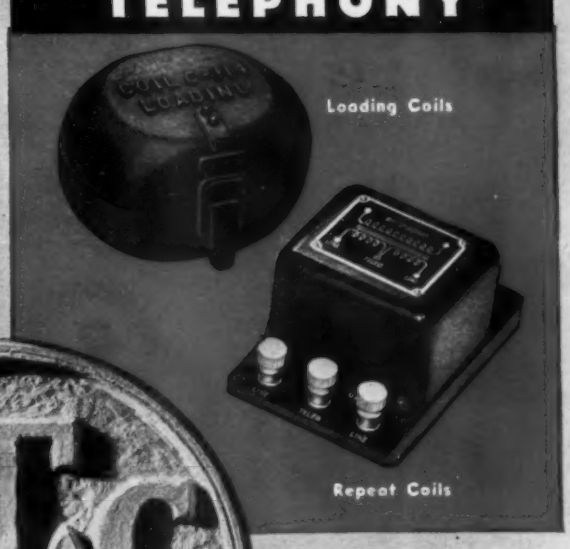
TRANSFORMER COMPONENTS

for every application

RADIO



TELEPHONY



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Foremost Manufacturers of Transformers to the Electronic Industry

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May we cooperate with you on design savings for your applications . . . war or postwar?

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LINEMEN'S PLIERS

FOR

POWER

to Cut,
to Twist,
to Hold!

BERNARD TOOLS GIVE

More Power to You!

Send for catalog of the Schollhorn line of BERNARD tools.

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TELEPHONE TOOL DIVISION
420 Chapel St. New Haven, Conn.
Exclusive Makers of
BERNARD Parallel Action Tools

Hubenthal Leads Oklahoma Move Toward Higher Rates

Indications that many Independent telephone companies in Oklahoma will join in requests to the Oklahoma Corporation Commission for rate increases are found in replies from a number of such companies which have been received by H. W. Hubenthal, secretary, Oklahoma Telephone Association, to his notice sent out on May 3, requesting information as to general rate conditions in the state. (TELEPHONY, May 12, page 32.)

No general increases in telephone rates of Independent telephone companies have been made since 1918, when conditions arising from World War I boosted telephone operating expenses about 40 per cent above the prewar level of that period. Then the higher costs were reflected principally in materials and supplies.

The Oklahoma Corporation Commission in a journal entry, effective November 1, 1918, ordered telephone increases on a state-wide basis to the following annual rates: Individual line, business telephone, $30 per year; individual line, residence, $18; multiparty, rural-owned, $15; extension residence, $9.00; rural service station, switched on lines not owned by the company, $6.00.

A number of companies, since the 1918 order, have presented individual applications for further rate adjustments and, where facts brought out at hearings justified, the commission granted further increases.

A central figure in the 1918 rate studies, as well as those being conducted at present, was H. W. Hubenthal. From 1916 to 1923, he was telephone engineer of the Oklahoma Corporation Commission. While serving in that capacity, he made studies of 75 Independent telephone companies which showed justification and need for the general increases of 27 years ago.

Now, as secretary of the Oklahoma Telephone Association, he again sees the need of general telephone rate readjustments due to conditions arising from World War II. As a result of advancing living costs preceding and during the early part of the present war, steadily mounting taxes and costs of labor, Mr. Hubenthal estimates that general operating expenses have risen approximately 50 per cent.

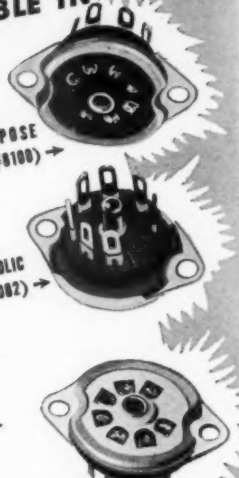
Cost advances at this time are reflected principally in higher taxes and wages. Many telephone companies are paying 100 per cent higher wages to telephone operators than before the war, Mr. Hubenthal said.

Whether the present studies being

EBY

SADDLE TYPE MINIATURE TUBE SOCKETS

AVAILABLE IN



GENERAL PURPOSE PHENOLIC (EBY #0100) →

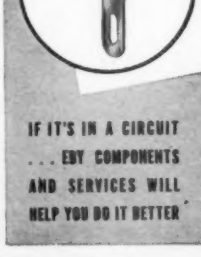
LOW LOSS PHENOLIC (EBY #0082) →

STEATITE (EBY #0083) →

The castings and beryllium copper contacts are identical with JAN S-28 Types SO 10M and SO 10C except that the shield base is replaced with a saddle. These EBY sockets meet the need for quality replacement of sockets of the saddle type. Write today for prices and samples.

LONG LIFE CONTACTS

The self-aligning beryllium copper contacts have been especially designed and Micro-processed to assure constant, even pressure on all parts of the socket pin without fatigue in contacts after continuous use.



IF IT'S IN A CIRCUIT . . . EBY COMPONENTS AND SERVICES WILL HELP YOU DO IT BETTER

HUGH H. EBY
INCORPORATED
10 W. CHELTEN AVE.
PHILADELPHIA, PA.

conducted by Secretary Hubenthal, through authorization of the board of directors of the association, will result in the bringing about of a general state-wide application, or in filing of a number of individual applications, depends upon the number of rate study forms returned to the association offices and the facts revealed by them.

V V

Eleven Wire Men Receive German Company Surrender

Wire men of the U. S. Army Signal Corps make good use of the rifles and the carbines they sometimes carry, states Battalion Wire Chief Sgt. Selmer H. Johnson of Henning, Minn., citing the performance of the wire personnel of the First Battalion, 358th Infantry, 90th Division, which, aided by two tank destroyers, knocked out an enemy company approximately five times their number in Bransheid, Germany.

The 90th Division moved into the town last February, relieving the Fourth Division. Sergeant Johnson with 10 other men was charged with laying the wires. Entering the town in early morning, they decided to wait in their jeep until daylight.

As they waited, they heard the sound of marching feet and ducking into a small house nearby, identified a company of Germans, a captain in the lead, marching in a column of three. Sergeant Johnson ordered his men to open fire with their carbines. They killed a number of the Germans when the latter unsuccessfully tried to rush the house.

The enemy captain, in an attempt to scare the signalmen, shouted in English, "Come out with your hands over your heads," and received Sergeant Johnson's reply advising him where to go. Then two tank destroyers came down the street shooting in every direction whereupon the German captain surrendered his men to the American wire unit, explaining that half of his company, about 60 men, were casualties.

V V

Replace Rusty Wire

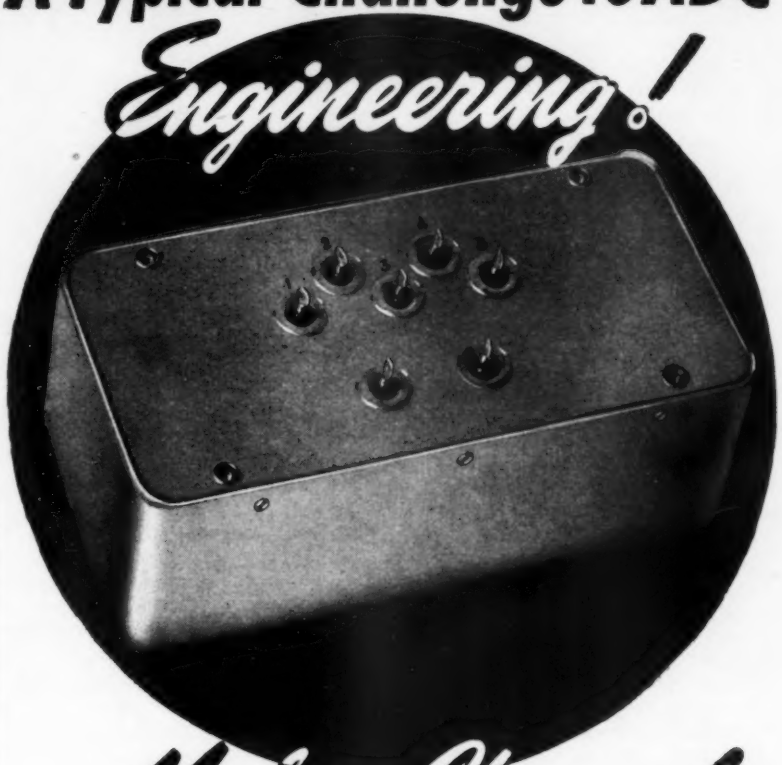
When line wire on rural lines becomes old and rusty, about the only thing that can be done is to replace it. It is more difficult to make a good connection on rusty wire and its replacement usually is not expensive.

V V

Pole Hole Diggers

Lightweight, portable power diggers now are coming into general use for pole hole digging. No doubt, these machines will replace hand digging on most rural line construction jobs after the war.

A Typical Challenge to ADC Engineering!



Multi-Channel

NARROW BANDPASS FILTER UNITS

● Like many of the problems brought to the Audio Development Company, this one involved a definite performance improvement with reductions in size and weight.

From an originally specified maximum weight of 40 oz. for potted one-channel interstage filters, the weight of this ADC five-channel unit was reduced to less than 10 oz. per section, hermetically sealed. Volume was reduced by over 50%.

Electrical performance was improved to provide a midband gain of 14±1½ db when the original specifications permitted a loss from 0 to 6 db. In addition, attenuation characteristics were improved to provide approximately 25 db discrimination at 1/3 octave with bandpass ±1½ db over ±3% of mid-frequency.

These filters are available in single or multi-channel units for frequencies from 200 cps to supersonic and carrier range. Frequencies lower than 200 cps are available with some size increase. Units can also be supplied in combination with high or low pass filters to permit tone channeling on voice circuits, thus allowing several remote control functions to be superimposed on a single voice circuit without interfering in any way with regular service.

We are ready to help with your filter and transformer requirements. Why not consult with us on your specific problem?

ADC

Audio Development Co.

2833 13th Ave. S., Minneapolis 7, Minn.

Independent Manager Has Talented Telephone Family

Eight-year-old Nancy Jean Cullings is the latest member of her family to keep the wires humming for the Mariaville-South Schenectady Telephone Co., Mariaville, N. Y., and its 150 subscribers.

An honor student in the third grade at the Mariaville school, Nancy's clear voice has been heard in a relief operator's role for a year now, sometimes as much as an hour or two daily.

Nancy always liked to operate the switchboard in her home but her graduation to the position where her parents have confidence she can do it alone came quite by chance.

One day Mrs. Cullings was busy elsewhere when the board buzzed and little Nancy Jean beat her to the connections. While her mother watched in surprise, the then seven-year-old faultlessly completed the call.

Since then she's been on her own, with any necessary supervision or help, of course. Local calls are "duck soup" to the youngster and even long distance calls don't faze her. From long periods of watching others operate the switchboard she learned the routine and memorized the standard telephone conversation phrases for operators.

She points with pride to her longest long distance call—one to Cleveland.

Eight-year-old NANCY JEAN CULLINGS operating the switchboard of the Mariaville-South Schenectady Telephone Co., Mariaville, N. Y. (Courtesy, SCHENECTADY GAZETTE.)

Nancy has a 16-year-old sister, Joanne, one of the operators, and a brother, Clyde, Jr., now nine years old.

Clyde doesn't let his sister get ahead of him in the matter of keeping communications open. He works outside, helping his father. He's a talented pole climber now — had been climbing for some time before mother found out.

Clyde, Jr., learned his telephoning when five years old as he chummed with his grandfather, the late C. A. Cullings who founded the company. One of his accomplishments was learning every tool by name so he came up with the right one when his grandfather called.

V V

Pennsylvania Independent Names Musselman District Manager

Paul W. Musselman recently succeeded Sol K. Herr as district manager of the United Telephone Co. of Pennsylvania at Chambersburg. Mr. Herr retired on advice of his physician.

Mr. Musselman, who was assistant manager of the Chambersburg district for the past three years, is a graduate of Millersville State Teachers' College. He was a high school instructor at Hampton, Va., and Leacock, Pa., before entering the employ of the telephone company.

Mr. Herr had been district manager since July 1, 1931, and previously was wire chief for seven years.

V V

Couple To Manage Exchange

MR. and MRS. EARL CARLON soon will assume management of the Elliott exchange of the Illinois Commercial Telephone Co., succeeding MRS. ANNA HANSON.

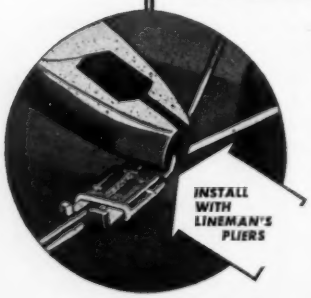
V V

Buys Oklahoma Independent

Charles L. Moore of Cyril, Okla., recently purchased the Verden (Okla.) Telephone Co. from L. H. Periman. The exchange has 137 town and 48 rural telephones.

SAVE INSTALLATION TIME

Using KEARNEY WEDGE-TITE DEAD-END CLAMPS



This Kearney dead-end clamp develops the full strength of copper or copperweld wire. It is installed with ordinary pliers and can be removed for salvage of the wire or clamp. Slack can be taken up or paid out at any time.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

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TELEPHONE ACCESSORIES

NEW SYSTEMS DEVELOPMENTS

SCHED-U-GRAPH

The chart-board control that makes facts PICTURE-CLEAR

● As a means of graphically charting factual data the Remington Rand *Sched-U-Graph* is considered the outstanding development of recent years. It has already found wide favor for controlling a variety of operations, and is readily applicable to many phases of telephone company activity.

For charting progress on engineering and installation projects, graphing sales, controlling installation and advertising activities, and for statistical charting of all types, Sched-U-Graph offers an entirely new form of Kardex "Fact-Power."

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Years of development have produced in *Kard-Site* a highly perfected form for reference records of all types. It is widely used also for machine- or hand-posted accounts receivable, stock control, purchase, payroll and other records where accuracy and speed are vital. The compact filing and dual offset visible margins place thousands of cards conveniently within the operator's vision and reach. Automatic "lock-down" and rounded-top *Kard-Site Guide* are Remington Rand features that contribute to long wear and fast, easy operation. Ask any Branch Office for new folder KD-323.

SYSTEMS DIVISION

REMINGTON RAND

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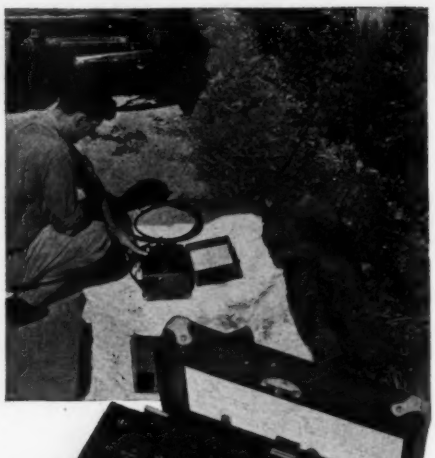
Averages $6.00 Saving Per Fault

This easy-to-use Wheatstone Bridge puts its finger on faults — locates grounds, crosses or opens — enables trouble-shooters to clear lines or cables in minimum time.

A recent survey among users indicates that this Test Set saves from 1 to 8 hours in locating faults, as compared with other methods. In terms of man-hour cost of trouble-shooting, it saves an average of $6.00 per fault. From this average figure, it appears that after locating 21 faults the instrument has saved enough to pay for itself. After its 21st location, this test set is actually earning money.

These savings, as well as the benefits of subscriber good-will are yours with the purchase of one of these Test Sets. Price is $125.00. If more information is required, write for Catalog E-53-441(1).

A FREE HANDBOOK explaining methods of using this Bridge for locating grounds, crosses, opens and other faults, will be sent on request. Write for Note Book E-53-441 "Notes on Fault Location in Cables."



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The War
You Will Surely
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Standard Hang-Up Type Telephone Has New Use

Don Hunter, general buildings and supplies superintendent of the Chesapeake & Potomac Telephone Co., Washington, D. C., recently developed a method by which standard hang-up telephone sets can be used as combined sets.

The new desk stand or handset, shown in the accompanying photograph, has a wooden base and upright which can be made from excess stock of backboards and junk booth panels.

V V

New Jersey Bell Considers Radio-Telephone Service

The New Jersey Bell Telephone Co., Newark, is considering establishing two-way mobile radio-telephone service to and from vehicles operating in the northern New Jersey industrial area, interconnecting with the regular telephone system, it was announced recently.

The service still is in the early planning stages, the company stated, adding that equipment needed to establish it is unavailable as yet.

As a preliminary step, a survey is being made among a cross-section of prospective users of such a service to learn what demand there might be for it.

V V

Fire Calls the Operator

Telephone signals flashed on the switchboard of a night operator at the Quincy (Fla.) Telephone Co., Inc., but there was no response to the operator's "Number, please?" Sensing trouble, although she had no way of knowing that the wires were being severed by flames that already had wrecked completely a cafe and a furniture store, the operator immediately notified the police who confined the blaze, saving the adjoining property.

USITA Committee Making Survey

(Concluded from page 41)

service expansion and improvement. It proposes only to explore this field in an effort to uncover the most important problems. Probably their eventual solution best can be left to standing committees of the USITA. They involve plant, commercial and even accounting phases of management.

The necessity for rate revision already is apparent. More and more of the small companies may be absorbed by necessity into the larger and stronger operating companies. The problem of manual control of unattended dial offices brings up a new field of inter-company relations. Discussions are being initiated with the view of determining standards whereby work performed by one company for another in connection with unattended dial exchanges can be compensated for on a fair and proper basis.

The rural service committee currently is making available to the USITA Rural Legislative Committee all data which it has gathered. Thus, the work of the former is a very important adjunct of the legislative committee itself. The work of the legislative committee must be based largely upon the factual data developed by the rural service committee. Thus, every care and caution is being exercised in the preparation of all reports.

The undertaking of the Rural Telephone Service Committee would be impossible of achievement were it not for the splendid cooperation it is receiving from state associations and operating telephone people throughout the entire United States. Needless to say, it may be necessary to call on these people for still further aid before any final conclusions can be reached. Meantime, the committee is pushing its work in order that a final report may be made at the earliest possible moment. This report should prove of real value to the entire Independent telephone industry.

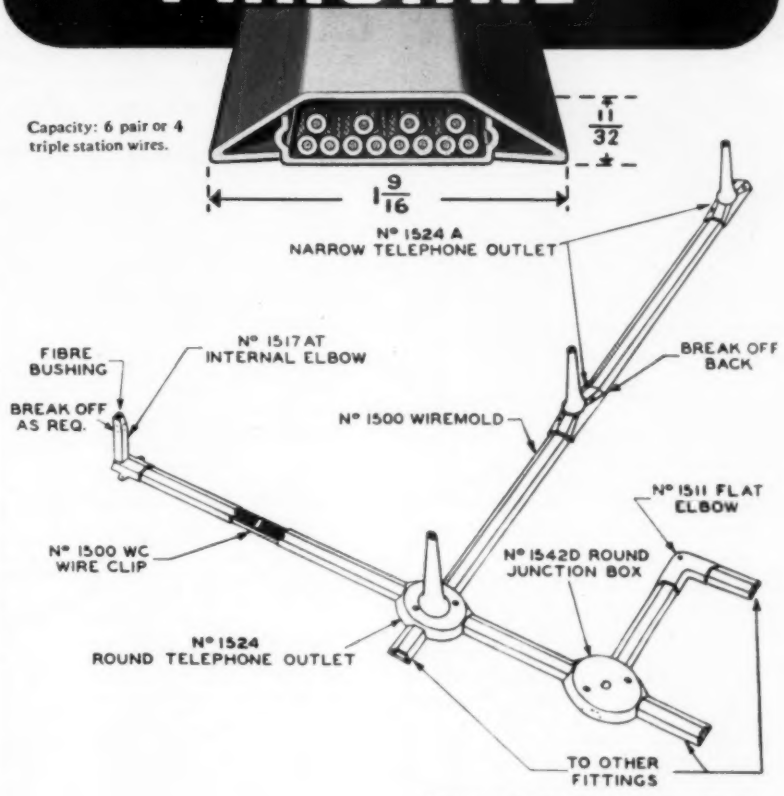
V V

Make Your Poles Stand

One common fault in rural line construction is setting of poles to an improper depth. Usually 20-ft. poles should be set to a depth of four feet in firm soil, five feet in sand or three feet in rock. If a pole of this length is set only three feet in average soil, there is every probability that it eventually will cause trouble.

OVERFLOOR WIRING FOR TELEPHONES

using WIREMOLD # 1500 PANCAKE


Capacity: 6 pair or 4 triple station wires.
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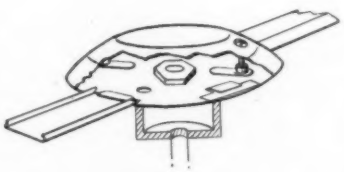
BREAK OFF BACK
Nº 1500 WIREMOLD
Nº 1511 FLAT ELBOW
Nº 1500 WC WIRE CLIP
Nº 1542D ROUND JUNCTION BOX
Nº 1524 ROUND TELEPHONE OUTLET
TO OTHER FITTINGS



Showing use of 1542D deep type junction box for connection to standard floor boxes.

Wiremold PANCAKE Overfloor Wiring Systems have been designed especially to meet Telephone Company requirements for extension wiring. Fittings are provided for making connections to existing underfloor ducts, floor boxes or other Wiremold raceway systems already installed. Wiremold PANCAKE raceways and fittings are "flat as a pancake and strong as a bridge" . . . trip-proof and unobtrusive.

Write for Catalog No. 16 and telephone installation engineering data sheets. The Wiremold Company Hartford 10, Conn.

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PERMATOX "A"

(A Straight Toxic Wood Preservative)

Reclaim OLD POLES

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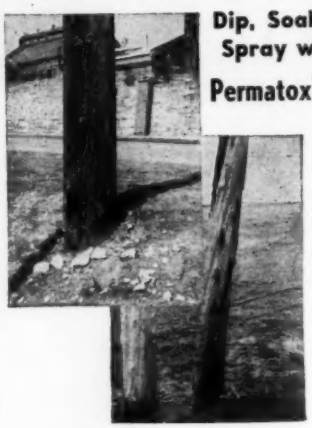

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Prevent Costly Pole Failures

With the pole shortage becoming more critical, it is vitally necessary to get the utmost service from every pole now in stock or installed on your lines.

PERMATOX "A" (5% pentachlorphenol in suitable petroleum solvents) affords an effective, economical preservative treatment . . . for the control of decay, shell-rot and termite attack.

Specify it for poles, posts, crossarms, ties, crossing planks, bridge timbers and other exposed construction. Soaking or pressure treatment insure adequate absorptions and deep penetration.

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NEW YORK WRITER PRAISES TELEPHONE SERVICE

IN HIS COLUMN, "Thinking It Over," in the Wall Street *Journal*, Thomas F. Woodlock recently gave an interesting resume of the progress and development of telephony in New York City, from the industry's beginning to its present high state of perfection. Mr. Woodlock also commented at length concerning the value of telephone service, compared to other utility services —stating that he would select telephone service over transportation and power.

Commenting upon the progress made by the telephone industry, Mr. Woodlock stated that it is no wonder that certain quarters in government would like to get their hands on the business. His full comments follow:

This writer vividly remembers the advent of the telephone in business, for it occurred within his own experience. When in 1892 he went to work as a reporter on the Wall Street *Journal*, the office equipment included a single telephone instrument and a single typewriter, both in charge of a single girl to whom we dictated (straight to the machine) the copy which filled the paper. The telephone instrument was far from busy. "Legwork" was the order of the day.

This writer does not know how many instruments there were in use in the financial district, but he remembers a day — and it was later than 1892 — when an important western railroad dividend was to be declared in an office on the second floor (or maybe third) of the building then standing at 40 Wall St., and it was a case of sharp rivalry between the Dow, Jones & Co., news agency, and its competitors for getting the first news to the street.

There was no telephone instrument in the offices of the railroad company. There was, in fact, but a single instrument on the entire floor and that had been engaged by "the enemy" early in the day! Dow, Jones & Co. had to fall back upon the primitive method of "signals" transmitted from a window of 40 Wall St. to an observer on the steps of the United States Trust Co., across the street. This man repeated them to an observer on the Sub-Treasury steps at the top of Broad Street, who duly repeated them to a third at the entrance to the basement of the Edison Building at 42 Broad St. where the entire plant and staff of the Dow, Jones news service and the Wall Street *Journal* were housed. A merciful providence so arranged it that the news came through correctly.

Reading over the report of the Bell telephone organization, this writer wonders whether the present generation can appreciate the magnitude of the achievement of the telephone industry in this country in the short space of a single man's lifetime of three-score and 10 years.

Here was something wholly new in human experience, a completely novel service with no precedents to guide its development. Its "economics" presented unusual problems for which there was no previous experience to serve as guide, particularly that of switchboard depreciation and obsolescence, which wrecked so many enterprises in competition with the Bell organization.

The demand for service, once started, grew with mushroom rapidity; the chart lines of instrument numbers through the years approach the vertical formation. Yet, the demand was met; the industry's managers had foreseen it and provided for it. It is true to say that at no time in its history, not even in World War I, did service ever notably fail to carry its load.

Finally, as remarkable a feat as any, the Bell enterprise has avoided the financial blunders that have so deeply spotted American corporate history and has so far proved as solid an investment for the ordinary small capitalist as can be found in the record here or anywhere. Last year it earned a net return on invested capital (unwatered) after expenses and taxes of 5½ per cent, which cannot reasonably be regarded as an unreasonable equivalent for service rendered.

One way to view the "worth" of that service is to suppose a purely hypothetical question. Let us imagine that to an enemy of the United States was given the power for 24 hours to paralyze a single "public service" in the country by merely pressing a button or turning a switch—how could he most effectively disintegrate the whole social process?

We have three main public services —transportation, power and telephone. Which would he choose and why?

It seems to this writer that he would wisely select the telephone service. It penetrates the life of the community more deeply at more points and more continuously than does any other. There are over 21,000,000 telephone instruments in the country. The total number of "calls" made daily on the Bell system is approximately 110,000,000. Nor should it be forgotten that whoever has an instrument at his disposal can talk to the ends of the earth, if need should arise, without moving from his chair.

There is not a single relation of man who is not the subject of telephone calls throughout the day. Suppose this service suddenly stopped without notice; only those who lived a third of their lives before it came into being can visualize the resultant on the country's life. What then is the "worth" of the service to the customer; to be measured against the cost of the service to him?

The present writer has seen in his day the advent of electric power and, if not the advent of the railroad, at least its emergence from 'teen age to

adult maturity, and, of course, all the later scientific marvels: Motors, movies, radios and the like. But somehow the telephone can give him still something of its first thrills.

It is no wonder that the teeth of our "tribunes of the people" water as they contemplate the Bell enterprise and think of its potentials, if they could but once get their hands on it!

V V

Install New Telephone Center At Camp Butner, N. C.

A new telephone center and lounge, installed, equipped and furnished at the U. S. General & Convalescent Hospital at Camp Butner, N. C., by the Durham (N. C.) Telephone Co., was opened formally May 9.

Serving combat casualties now undergoing treatment at the hospital, the lounge is equipped with eight long distance and four local telephones, as well as a central sound system, and features a novel lighting device that flashes a light when a connection has been made. Men placing calls are assigned to specific booths by a loud-speaker system. Two supervisors, Mrs. Grace White of Durham and Mrs. Eugenia Knott of Creedmoor, N. C., have been assigned to operate the center.

Attending the formal opening program were a number of telephone officials including T. D. Wright and Ralph Van Trine, president and vice president, respectively, of the Durham Telephone Co.; R. E. Kepler, general superintendent; J. C. Cozart, the company's representative at Camp Butner; Harvey Booth, district manager of the Southern Bell Telephone Co.; W. P. Blanks and Paul Caldwell of Southern Bell.

V V

Agency Standardizes Signal Corps' Equipment

The Signal Corps Standards Agency, formally set up at Red Bank, N. J., on January 1, 1943, has, during its first two years, promulgated 39 standard specifications which cover a wide variety of component parts and materials, and has issued over 2,300 qualification approvals for items which have passed all the tests. Basic features of this feat have been the complete co-ordination between the Army and Navy, through the Signal Corps agency and the Bureau of Ships, and the active cooperation given by communications industries throughout the country.

The program of standardization has four chief aims: (1) Interchangeability of items; (2) maintenance of required quality; (3) simplification and reduction in number of types; (4) establishment of grades and classes so

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Volume I is a simple yet comprehensive treatment of the normal thought process applied to engineering problems. This volume also sets forth the principles of logical analysis in the light of emotional bias and other disruptive factors and explains how these may be applied, in writing, to engineering presentations.

Volume II is essentially an English handbook, written particularly for engineers. Using the decimal reference system, this book permits easy and rapid reference in the "language problems" of the engineer.

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that the better qualities may be used in the more critical applications.

The first step in activating this program is the promulgation of standard specifications. In general, these are performance specifications, the material and construction being unspecified, although there are a few exceptions to this rule. Ideal requirements are modified, when necessary, to meet the practicalities of production and the availability of various materials, but they are based, as nearly as possible, on grades acceptable for use in the military service.

Such grades must meet the exacting conditions which war imposes, including shock, vibration, extremes of temperature and of barometric pressure, and the subtler, but no less deadly attacks of humidity and fungus growths. Simplification of sizes and styles is a continuous goal of the program and in some cases can be attained by the specifications, themselves. In other cases, it is necessary to draw up a preferred list, compromising with conditions as they exist, rather than as might be desired.

The second step in the program is concerned with tests and approvals. Samples made by manufacturers under the specifications are put through a series of tests, and then qualification approvals are issued for items which have passed all tests.

An important and constructive feature of the agency's work is direct assistance to manufacturers by suggestions for improvements in design or in quality control.

The third and final step in the procedure of standardization is the application of standard specifications. Specifications and approvals by the Standards agency are of little value to the Army so long as they remain in the stage of theory or even experimentation. Hence, application is, in a sense, the most important practical phase of the entire standardization program.

To insure that items which have passed muster shall be used adequately in war equipment, designers of new equipment are required to make use of approved standard items. In reorders of equipment, too, the use of standard items is required.

V V

Power Line Interference

Power interference has caused considerable rural line trouble in many sections of the country. When power lines parallel grounded telephone circuits, noise trouble usually is extremely bothersome. This trouble can be eliminated, or reduced to such a point as not to interfere with voice transmission, by avoiding power parallels as much as possible, metallicizing telephone circuits and transposing as required.

V V

Bad Telephone Habits Reviewed By Columnist

The Utica (N. Y.) *Observer-Dispatch* on April 1 published an item, entitled "'Phone Trouble: Are You Guilty of These Faults?" Although the bad telephone habits seem improbable, they are not April Fool's Day jokes! Following is the item:

Telephone technique is important as a factor in human relations.

Everyone knows professional operators have been trained to cultivate the "voice with the smile."

Subscribers, however, have been left to go their own way.

There are some who pick up the receiver prepared to do battle with whoever is on the other end of the line, judging by the tone of voice. . . .

There are the teen-age users who have no regard for time, and some in the same class who left teen-age behind years ago. There are eccentrics who call a number and, upon getting a response, hang up.

Then there are those whom the telephone executives regard as among their greatest trials—the householders who have subscribed to telephone service apparently only to make outgoing calls.

The bell peals for them and they

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DAN'L H. McNULTY, *Manager*
Rogers Park Station Chicago 26

disregard it. One young woman who is known to do this occasionally declares it is "self-protection." She claims that by the time she gets upstairs (if she happens to be in the basement laundry), the calling party has hung up, or, when she gets downstairs (when she happens to be on the second floor), the same thing happens. That same young housewife says four rings is "the usual call" and that, if the rings continue past that number, she answers.

One woman will not answer the telephone because of her high blood-pressure. She says it makes her nervous.

There is the woman with a large family who leaves the answering of calls to the boys and girls. They answer the telephone, call her, leave the receiver off the hook and go blithely away. She sometimes hears them; more frequently she does not. The busy signal keeps her party line sharers in turmoil.

Some telephone subscribers seem to think it essential for prospective callers to make definite appointments. They are known to listen to the ring and wonder "who that is." Occasionally they say "that must be Minnie," or "Bill" and rush to answer. They have been advised beforehand to expect a call at such-and-such a time. . . .

Often those wilfully deaf are the losers, when someone with an invitation, a real bit of news or a warning of trouble is turned away from Mr. Bell's contraption by their refusal to answer.

V V

Puerto Rico Governor Signs Appropriations Bill

(Special to TELEPHONY)—Gov. Rexford G. Tugwell recently signed a bill passed by the Puerto Rico Legislature appropriating $390,475 to the Puerto Rico Communications Authority, the largest portion of which will be used for the construction of a radio broadcasting station. (TELEPHONY, April 21, page 35.)

Of this amount, according to the legislation, $158,950 is for installation of dial telephone equipment operated at the city of Caguas by the authority, and $7,650 for a similar project at Guaynabo, in the vicinity of San Juan. A total of $135,000 was granted for the broadcasting station. The balance of the fund was designated for new construction and rehabilitation of facilities—chiefly telephone lines.

With the approval of this appropriation, the communications authority enters the broadcasting field on a commercial basis.

V V

Re-Elect War Fund Head

THOMAS C. WOODS, vice president of the Lincoln (Neb.) Telephone & Telegraph Co., has been re-elected head of the United War Fund of Nebraska, Inc. Contributions totalling nearly $1,000,000 were made to the state fund last year, with 78 of the 93 counties over-subscribing.

STROMBERG-CARLSON
Recommends...

POSITIVE GRIP SPINNING WIRE CLAMP

Manufactured by
Cable Spinning Equipment Co.

A tool easy to operate with one hand. Quickly secures spinning wire when working on spun cable until a permanent serve-up can be made. Made of bronze with cadmium plated steel screw. May be left on the strand for days without the screw freezing in the nut.

DIAMOND C POLES
For Strength

Mfd. by Colfax Lumber & Creosoting Company, Inc.

For the greatest strength in poles, use COLFAX Creosoted Yellow Pine Poles.

The poles are treated full length under pressure with the finest and cleanest obtainable grade No. 1 Creosote Oil, a pure distillate of coal tar, in accordance with AWPA standards.

Each pole, after being carefully graded according to the physical specifications, is treated with eight pounds of creosote, or more if the customer desires.

COLFAX Creosoted Yellow Pine Poles will assure you the lowest annual pole cost obtainable.

For strength and economy, use
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Creosoted Yellow Pine Poles

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Hexacon Soldering Irons Available for Battery Use

In meeting the demands of the war effort, Hexacon Electric Co., 137 W. Clay Ave., Roselle Park, N. J., has been called upon by the armed forces to develop electric soldering irons for operation off batteries of trucks and planes.

Hexacon irons now are available, on rated orders of AA-5 or better, in 100 or 200-watt sizes, wound for either 12 or 24 volts. All such irons are available with either six-foot or 12-foot cords, and with the conventional plug cap or battery clips.

All Hexacon irons so equipped also have such features as damage-proof, hexagon-shaped barrels (protects element from mechanical injury) and scale-resistant element cores (prolongs element life), it is said.

These irons are built for hard continuous service and speedy production. The rugged construction adds to the life of the iron and the quick heat and light weight fits Hexacon irons for repairs, maintenance or production work.

V V

W. W. Gould, Stromberg Representative, Dies

Wilbur W. Gould, telephone sales representative of the Stromberg-Carlson Co., died April 30 in Barnes Hospital, St. Louis, Mo.

Mr. Gould represented Stromberg-Carlson in southern Indiana, southern Illinois and parts of Kentucky and western Tennessee, from September, 1943, until the time of his death. His death followed a long period of illness with leukemia.

He was born in Lawrenceville, Ill., June, 1906. Prior to his association with Stromberg-Carlson, he was employed by the Suttle Equipment Co. as a sales representative in the Illinois territory.

He is survived by his widow, a daughter, his father and stepmother, a sister, two aunts and two uncles.

Among the members of the telephone fraternity present at the funeral services in Lawrenceville were: H. T. McCaig, Chicago branch office manager, Joseph Thompson, representative, and William J. Pfaender, telephone sales manager, Chicago division of the Stromberg-Carlson Co.; Mr. and Mrs. John Harbaugh, and Mr. and Mrs. Paul Harbaugh, Sullivan, Ind.; G. J. Welborn and Virl Watkins, Princeton, Ind.; Mr. and Mrs. William C. Strehl, and Mr. and Mrs. B. D. Quackenbush of Suttle Equipment Co.

V V

P. V. Black Appointed By Graybar

The Graybar Electric Co., Inc., recently announced the appointment of P. V. Black as district operating manager of its Pacific district with headquarters in Los Angeles, Calif.

Mr. Black, native of Iowa, started his Graybar career in 1918 in the accounting department of the Denver office. He served there until 1933 when he was moved to Kansas City. Two years later he was assigned as an auditor to general headquarters in New York City. He has been serving as acting district operating manager in Los Angeles since June 1, 1944.

V V

"Speech Weaver Wanted"— It's a Telephone Operator!

How to attract prospective employes is illustrated by the lyrical tone of a recent Louisville, Ky., want ad.

"Speech weaver wanted," the advertisement began, then really got going.

"In this absorbing job you become a spinner of fate; you influence the lives and destinies of important people everywhere. The order for ships and guns that MUST go through is at your finger tips. . . . The hurried, nervous farewell of a soldier to his girl must clear through you. . . . The heart-tilting talk of a wounded boy, just come back, and his mother, depends on your skill as a telephone weaver of speech."

That last phrase let the cat out of the bag—a switchboard operator was wanted.

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Cedar Poles
MICHIGAN POLE & TIE CO.
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POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

C. M. Christiansen Co., Phelps, Wis.—Northern White Cedar Poles, plain or butt treated. Quotations on request.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants: Beaumont and Texarkana, Texas.

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Pensacola Creosoting Company, Pensacola, Fla.—Creosoted Southern Pine. Poles of Superior Long Leaf Quality.

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Rates 10 cents per word payable in advance. Minimum charge $2.00 for 20 words or less.

HELP WANTED

HELP WANTED: Large telephone company operating in Kentucky and Tennessee has openings for plant superintendent, district manager and automatic central office equipment maintainer. Inquiries from qualified individuals solicited. State age, experience and draft status. Write Box No. 2163, c/o TELEPHONY.

WANTED: Combination plant man able to maintain both inside and outside plant of either common battery or magneto exchange. Opportunity for permanent employment and good wages. Give age, experience, draft status and availability. Write Oklahoma Telephone Co., Broken Arrow, Okla.

WANTED: Lineman for telephone company operating approximately 2,500 stations in eastern Pennsylvania. Give full information as to age, experience, draft status, etc. Statement of availability necessary. Write Box 2152, c/o TELEPHONY.

WANTED—DISTRICT MANAGERS: A midwestern Class A telephone company has an opportunity for one or two enterprising men as district managers. These men must be hustlers, thoroughly versed in the plant, commercial and traffic functions of the telephone business and capable of supervising five to seven exchanges. Salary commensurate with ability and responsibility. State all qualifications and particulars in first letter. WMC regulations observed. Write Box No. 2157, c/o TELEPHONY.

HELP WANTED

WANTED: Competent man under 45 desiring peacetime job, who understands construction, switchboards and trouble shooting for a small group of exchanges in Wisconsin with under 2,000 subscribers, to work with small crew and supervise work and independently as needed. If interested, notify this office giving qualifications and experience. Write Box 2158, c/o TELEPHONY.

WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Fort Wayne, Indiana.

FOR SALE

FOR SALE: 200 two-cell battery boxes in good condition at 40 cents each. Write North Star Telephone Corp., Mountain Lake, Minn.

FOR SALE: Two-position Western Electric No. 551B PBX, each position equipped with line relays, 80 lines, 10 trunks, 15 cord circuits, with terminals, fuses. Wall type, complete with three-ampere charger and charge control unit. Also, equipped with a Western Electric eight-station crash alarm with remote control feature. This equipment, new in 1944, and used slightly over one year. Write Ellensburg Telephone Co., Ellensburg, Wash.

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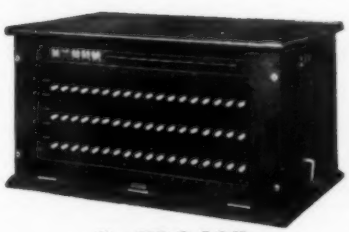
W. E. CO. P.B.X. COMMON BATTERY SWITCHBOARDS

W. E. CO. No. 505-C



No. 505-C P.B.X.

Equipped with 3 Trunks, 10 Stations to 5 Trunks 12 stations, 5 Connecting Circuits. Trunks Are Drop Signal Ending. Local Lines Are Equipped with Target Type Visual Signals. Cabinets Can be Supplied in Either Oak or Mahogany Finish.

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BOOK REVIEW

The McGraw-Hill Book Co., Inc., recently announced publication of the first edition of Earle S. Hannaford's book, entitled *Conference Leadership in Business and Industry*, which now is on sale for $3.00. Orders for this book are being taken by TELEPHONY.

Mr. Hannaford, who has a M.S. degree, is supervisor of training practices, Long Lines Plant Department, American Telephone & Telegraph Co. He formerly was chairman of the engineering division at Jefferson College and was assistant professor of electrical engineering, Georgia School of Technology, Atlanta.

The 289-page, attractively-bound book is a 1945 addition to McGraw-Hill's Industrial Organization and Management Series, and provides a practical, step-by-step procedure for conducting day-to-day business conferences and formal conferences. The book, in 18 chapters, draws from the common sense, practical applied psychology of handling people such ideas and practices as will result in the development of an effective and workable conference leadership technique. It includes procedures for preparing conference material and guiding and shaping discussions, and suggested programs for training and development in conference leadership.

V V

Proposes New Dial Office

The Pennsylvania Telephone Corp., Erie, recently proposed the establishment, as early as possible, of an unattended dial office at Bear Lake, Warren County, to connect with its Corry exchange. The new Bear Lake office is to serve some 40 subscribers.

WANTED TO BUY

WANTED TO BUY: Telephone company in California. Will pay cash. Write Box No. 2149, c/o TELEPHONY.

Reconstructed Equipment

Kellogg or Dean 100 ohm drop coils @	$0.25
Reliable Elec. No. 7A or T. Fiber Fuses @	.05
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Kellogg or W. E. New composition Rec. Shells and caps @	.45
Kellogg, Dean, W. E. Monarch, Stromberg or Am. Elec. Composition Mouthpieces. (New) @	.60
Dean Talk Through Repeating Coils @	.75
Kellogg No. 1025 C. B. Lineman test set, all metal type with 2 Cond. cord less test clips @	4.25
Western Elec. No. 1001-C all metal hand set with push Button in handle, complete with 3 Cond. Cord @	5.00
Western Elec. No. 2c Bell type drops and jacks per strip of 5 @	8.25
Western Elec. No. 22c Shutter type line drops and jacks per strip of 5	10.50
Kellogg No. 103 1 M. F. Condensers @	.40
48 Volt Swbd. Lamps per 100	5.00
Kellogg Listening ringing and ring back keys latest type with Battery cut off @	3.75
Stromberg-Carlson double cut-off jacks 10 per strip @	3.00
Kellogg No. 115 Grabaphone with all metal hand set complete with 3 Cond. cord @	7.00

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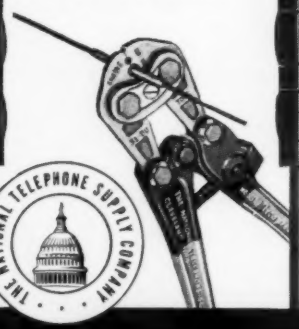

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